FOOD INDUSTRIES

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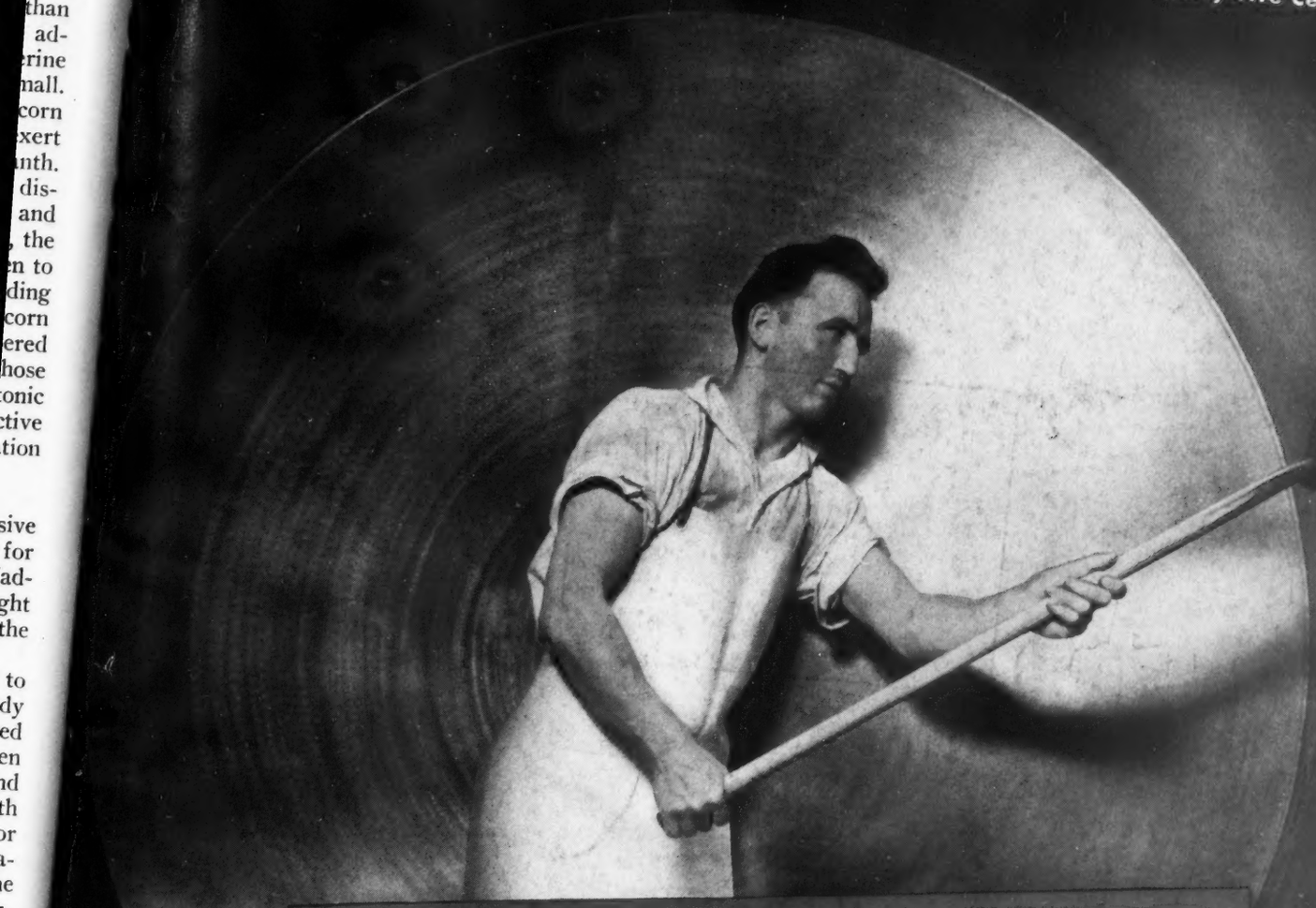

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GENERAL ELECTRIC

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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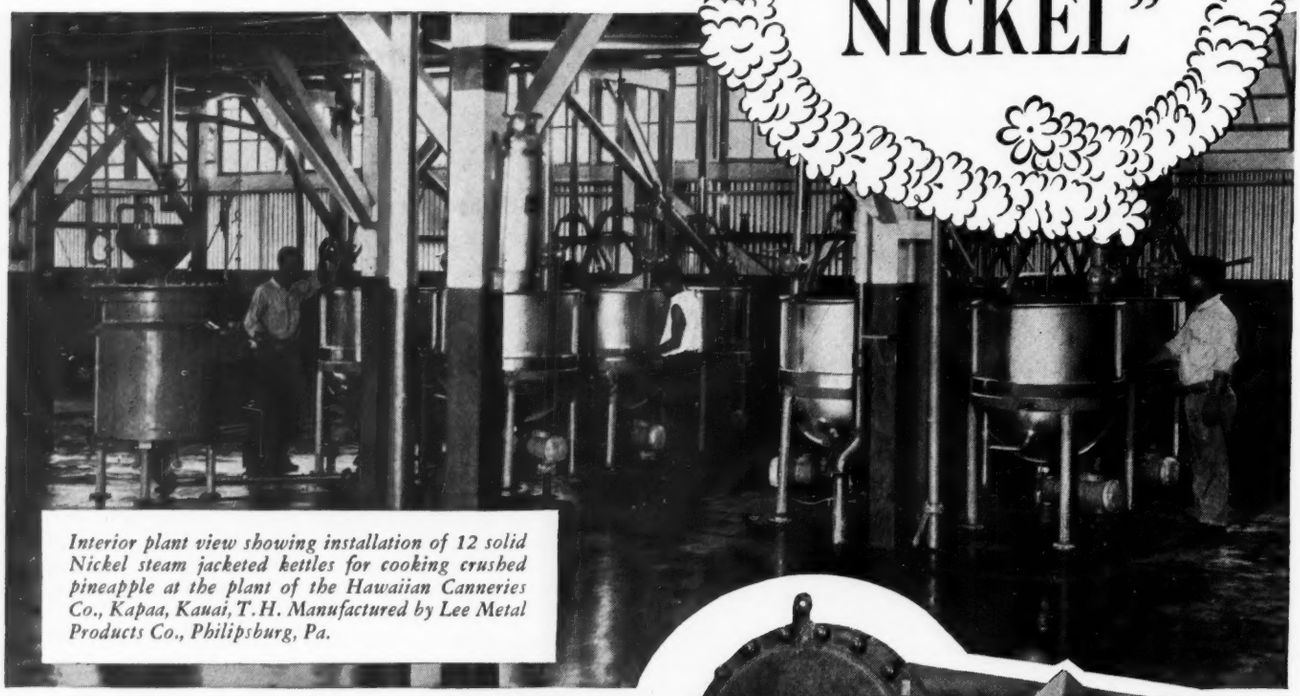
PINEAPPLE CANNERS SAY: "ALOHA... NICKEL"



Interior plant view showing installation of 12 solid Nickel steam jacketed kettles for cooking crushed pineapple at the plant of the Hawaiian Canneries Co., Kapaa, Kauai, T. H. Manufactured by Lee Metal Products Co., Philipsburg, Pa.

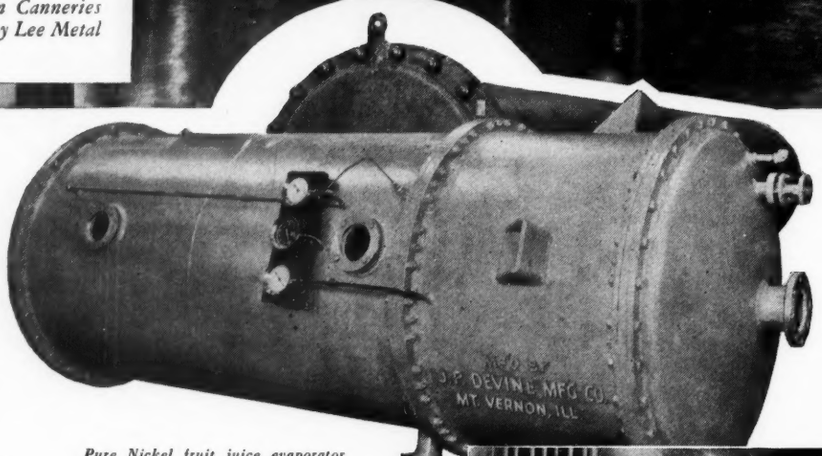
ALOHA is a handy word in Hawaii —a word that means both *welcome* and *goodbye*. As *welcome*, it's a useful word for discussing equipment made of pure Nickel. As *goodbye*, it is also useful, as you see below:

Welcome—to Nickel's tough strength and its excellent heat transfer properties. Any canner is glad to install equipment that takes punishment, and gives highly satisfactory service year-in and year-out. Welcome, too, is Nickel's saving in maintenance cost and repairs.

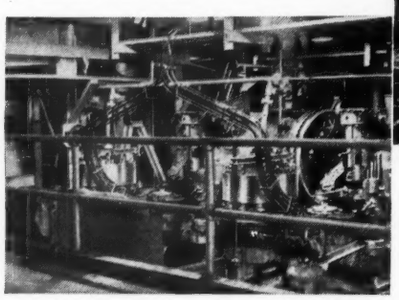
Goodbye—to rust and corrosion. Nickel is absolutely rust-proof and highly resistant to corrosion by fruit juices, brines and syrups. So goodbye, also, harmful metallic contamination.

No wonder this metal is welcomed by pineapple canners for all the uses shown here, as well as for heating coils, conveyor piping and fittings, filters, tanks, agitators, hoppers, pulpers, accessories and utensils.

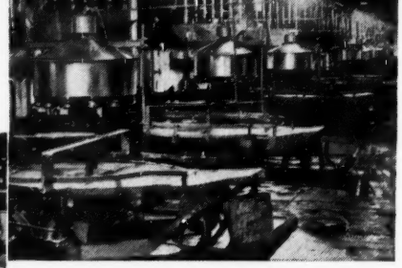
No matter what food product *you* pack or process, you'll be interested in the Inco "Illustrated Guide for Equipping Food Plants." Send for it.



Pure Nickel fruit juice evaporator built by J. P. Devine Manufacturing Co., Mt. Vernon, Ill. 4'6" inside diameter x 11'3" high between heads, single effect. This evaporator is of solid Nickel construction with the exception of the steam chest which, as it does not come in contact with the product, is constructed of regular steel plate. Solid Nickel tube sheets, with 252-2" O.D. x 17 ga. x 39½" long seamless cold drawn Nickel tubes.



Anderson-Barngrover pineapple juice fillers, with pure Nickel valves, floats and all contact parts. Installed in Honolulu cannery of California Packing Corporation. There are three of these fillers, but only two are shown in the photograph. Mfd. by the Anderson-Barngrover Mfg. Co., San Jose, Cal.



Anderson-Barngrover syrupers, with pure Nickel bowls, valves, floats and all contact parts. Installed in Honolulu cannery of California Packing Corporation. There are 14 of these syrupers, 12 of them 12-valve, the other two 8-valve. Mfd. by the Anderson-Barngrover Mfg. Co., San Jose, Cal.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET
NEW YORK, N. Y.

FEBRUARY 1936

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Vol. 8, No. 2

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Laurence V. Burton, Editor

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THE TALK OF THE INDUSTRY

ALL vehement statements to the contrary, notwithstanding, the publication of the salaries of the officials of corporations is a swell idea. For one thing, it has caused this department to lower its ideas of the right salary for an official. Not so many months ago a gentleman from that canyon of wickedness, known as Wall Street, invited us to consider

the presidency of a large brewery which, to put it mildly, needed less brawn and more brains at the top.

Whenever a presidency is offered to this department, the routine procedure is to yawn languidly and inquire in a manner of affected detachment for details on the prospective job.

"This brewery job," said the man-hunter, "is a tough job, hard work, and small salary."

"Tough jobs and hard work are not novelties in our existence, but we do not like the sound of the small salary."

"Sorry, but those are the conditions."

"Then you are not prepared to be generous?"

"We are not-t-t-t-t-t!" he answered with emphasis.

"Well, then, let us stop the conversation while we are still friends."

Of course, all of that was before the S.E.C. had made public many salaries. Since then we have decided that a small salary—say $30,000—is not so stingy after all, and that by rigid economy, we might be able to squeeze through.

POLITICAL NOTE: It would really be very sad if R. G. Tugwell, our "liberal" Under-Secretary of Agriculture, were to be gagged after the fashion which the daily papers indicate is the desire of the Democratic National Committee. We sincerely hope that Professor Tugwell will be allowed to continue to expose his desires for autocratic power over his fellow man—at least until Nov. 2.

In one respect, Professor Tugwell and this department are in accord. We both know that we know how the other fellow could live his life better and arrange his personal affairs much more satisfactorily according to our respective peculiar viewpoints. But from that point onward we differ, for we, ourselves, being really liberal are satisfied with the mere knowledge, whereas the learned but unwise gentleman from Washington, being fundamentally dictatorial, insists upon imposing his concept of life on everybody.

AN American food technologist is largely responsible for the fact that our American Independence Day, July 4, is a holiday in Denmark which has been celebrated there for 26 years, with the exception of those years when the United States was at war with Germany. Beginning in 1909 as a small local event, in recent years it has assumed the proportions of a general holiday.

The annual observance of the event in Denmark is the result of the activity of the late Dr. Max Henius, of Chicago and Denmark, who died only a few weeks ago. He was president of the Wahl-Henius Institute devoted to the brewing and fermentation industry. To him more than to any one else is due the credit for this unusual expression of international good-will.

Near Aalborg, in the upper part of Jutland, is the 400-acre Rebild National Park, where the annual celebration is centralized. This park also is largely the realization of Dr. Henius' vision, though many other Danish Americans and citizens of Denmark have contributed generously to the Rebild movement. In no other country is there such a celebration of this purely American institution.

SPEAKING of Consumers Research, Inc. and its genial president, F. J. Schlink, another idol has busted. The other day we sought to inquire into the qualifications of that gentleman as an advisor on mat-

ters nutritional, for surely a man who can write a book such as "Eat, Drink and be Wary," advising the public on what to eat, must be a very well-trained nutrition chemist with wide experience in the science of food.

Of course, we knew that Arthur Kallett, the other member of that well-known team of Kallett and Schlink, of guinea-pig fame, is not a food specialist, because we had heard him testify at the hearings on

the Food and Drug Bill down in Washington that he is an electrical engineer. Therefore, we were quite certain that Mr. Schlink must be the food specialist of the duo.

Imagine our consternation on looking up Mr. Schlink in Who's Who in Engineering, to read some of the following information:

Engineer, physicist. University of Illinois, B.S. (Honors) 1912; M.E., 1917; president, student branch A.S.M.E.; assistant mechanical engineer, two metallurgical plants, 1912-13; assistant physicist, associate physicist, technical assistant to director, U. S. Bureau of Standards, 1913-19; physicist in charge, instrument control department, Firestone Tire & Rubber Co., Akron, Ohio., 1919-20; mechanical engineer-physicist, Bell Telephone Laboratory, New York, 1920-22; assistant secretary, American Standards Association, New York City, 1922-31; technical director, Consumers Research, Inc., 1927; patentee of novel type of stabilized platform weighing scale for precision weighing; of precision methods of notching beams of scales; of a method and machine for measurement of the area of leather; author (with Stuart Chase) "Your Money's Worth," Macmillan Co., 1927; numerous publications appearing in the series of scientific and technical monographs of the Bureau of Standards; and in various encylopedias and scientific, technical and trade press of the United States and Europe; in the field of physics of measurements, measuring instruments, applications of physical laboratory methods to engineering measurements, registration of high-speed displacements, pressures, etc.; design and calibration of mechanical instruments; engineering and industrial standards and specifications; investigations and tests of ultimate consumers goods; economics of consumption; fellow, American Physical Society; fellow, A.A.A.S.; member, Philosophical Society of Washington; A.S.M.E.; Sigma Xi; Edward Longstreth Medal of Franklin Institute (for design of precision scale) 1919; chairman, A.S.M.E. Research Committee on Measuring Instruments, 1919-24; technical director, member of board, Consumers Research.

On looking into American men of science, we find less detailed information but the further interesting statement that Mr. Schlink is a licensed engineer.

From the foregoing information we reached the dismal conclusion that as a specialist in nutrition, Mr. Schlink is a first-class engineer.

Hors d'Oeuvres

• Italian scientists, apparently not completely occupied with the development of Ethiopian eradicators, have made synthetic wool from casein. Manufactured by processes and machines similar to those used in making rayon, a pound of the wool is produced from a pound of coagulated skimmed milk.

• *Beef cattle shipped from certain Hawaiian ranches to market in Honolulu are driven into the water and forced to swim out to freight boats. American shippers are more modern. They put water into the steers.*

• More than five billion "Ritzes" were consumed in the year following their introduction in November, 1934. Does it pay to advertise? Ask National Biscuit Co.

• *If you have doubts about prosperity, take a tip from the ice cream manufacturers. They sold 180 million gallons in 1934 and an even greater amount last year, as compared with 150 million gallons in 1933. How much in 1929? Well, 250 million gallons, but don't expect too much.*

• *Food not only sustains the people, but it provides a major portion of their entertainment. NBC reports that foods are second only to drugs and toilet goods in broadcasting expenditures, and that is not including wine and beer programs.*

• Two teaspoons of caviar a day will cure or prevent rickets in children, tests have proved. This treatment ought to lift the left eyebrow of the child so he can wear a monocle when he grows up, too.

• *Maybe the British are conservative but they love their steel industry. And already they are experimenting with tin cans as beer containers, taking their cue from the brewing industry in this country.*

• Here's another straw in the breeze of recovery. Manufacturers are putting special guards in their plants nights, week-ends and holidays as protection against fires. Sounds irrevelent, but fire hazards are greater in boom than in depression times. If business gets any better, the New Dealers probably will burn the Constitution.

Berry's Council

WELL, its here. What? The Puppet Council. The one we spoke about last month. Major Berry has had his way. His latest "industrial conference" has been held behind closed doors. Only those who were known to be favorable to Major Berry were admitted. Only four or five men of industrial prominence were present in a group of about 120 people, but there were plenty of unattached Washington lawyers, a number of trade association secretaries without authority to act, and a generous sprinkling of NRA men.

This is the council which will be dramatized as the spokesmen for American Business. As we said before, it will be neither a council nor industrial.

Hot Money

IF everybody who thinks that some of the money in escrow for the late and lamented processing taxes belongs rightfully to him, should start legal action to recover it we would not be surprised. If everybody starts fighting for what he thinks is his'n, the $180,000,000 won't last very long, and the lawyers will get it all. To illustrate: one corporation visualizes a possibility of more than 200,000 such lawsuits for various bites out of its $12,000,000 now in escrow—an average of about $60 each.

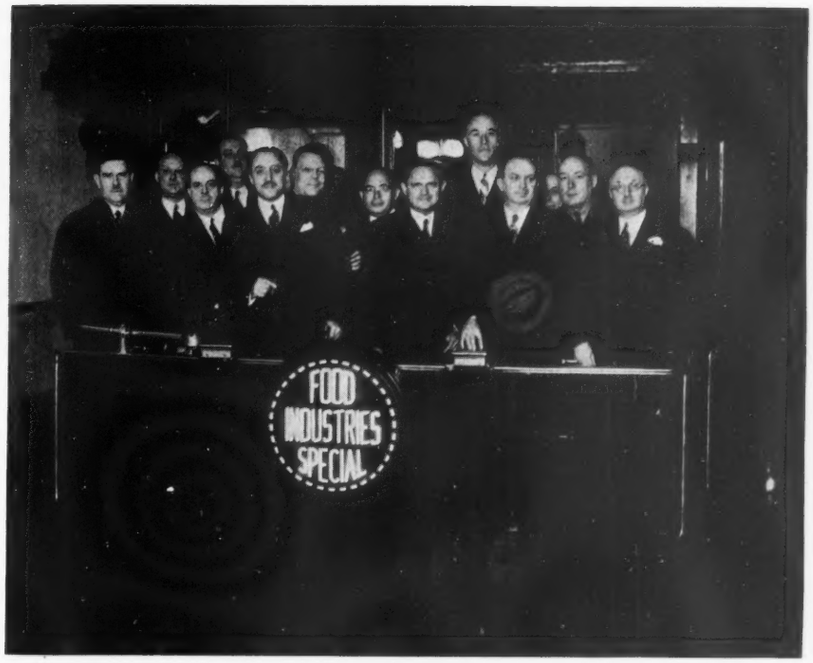
One point is clear. Those buyers of taxable foods who demanded that the processing taxes should be billed separately were good business men. But those sellers who refused to give in to such demand were better business men. And those who gave in will presently realize the folly of billing the processing taxes separately for it is very doubtful if any concern will ever recover from escrow a sum of money anywhere near as large as the secondary claims for refund where the taxes were billed separately.

Still more of a mess is the income tax aspect of processing taxes recovered from the courts. Is it 1935 or 1936 income? Assume that the income tax is paid on the recovered processing taxes, and that in a later year a successful suit is made for a secondary refund through a buyer, can the processor recover the income tax of that portion which he may be compelled later to pass along?

And a still greater mess is the question of recovery of processing taxes which were paid into the Treasury by those who refused to contest

the law, or by those who paid their taxes prior to securing an injunction, If the tax was collected illegally, it looks as if the Treasury ought to give it back. But "try and get it!"

And then there is another angle. Some concerns which billed the processing taxes separately from the selling cost of the goods are due for refunds of money in escrow. But rather than enter into rows and law suits with their own customers over the ownership of the money they are considering not asking for refunds. Instead they think it would be wise to be able to advise the secondary claimants that the money is in the hands of the courts and, in effect also, "try and get it!"



CHICAGO BOUND

The trainmen have called "all aboard," and food men from the East are off for the convention of canners, pickle packers, brokers and allied industries. This Food Industries Special traveled from New York via the New York Central route. Other convention specials were dispatched to Chicago by other railroads. All were heavily loaded, and early estimates placed the convention attendance at 25,000.

Diet and Health

FOOD faddists will find much encouragement in a new German book. "Gesundheit durch richtig und einfache Ernährung," by Mikkel Hindhede. And farsighted management in food processing industries will want to tarry a moment over the significance of the experiences and teachings of this volume to the long-range plans of their respective industries.

In a review of this book in *Nature,* no less an authority than R. H. A. Plimmer indicates that the health and well-being of human subjects have been maintained at a very high level at a cost of 6d (about 12 cents) per person per day. Not much of a food manufacturing industry could exist if Hindhede diets should ever become popular—unpalatable though they may be.

Our own guess is that unless the American food industry becomes greatly impoverished by the acts of the government, the power of advertising will keep the more palatable foods on the American dinner-table. The goods that are going into consumption are the only ones that really count. Consumers are not rapidly won or lost.

Let's Export Processed Food

EXPORTING man-hours of factory employment is just as important as exporting agricultural materials. The food industries have failed to make enough point of this in Washington. They have not made it clear to the Administration that it is far better to send out a ton of *manufactured* food, which includes many man-hours of American employment, than it is to market merely the equivalent wheat, corn, rice or other *primary* agricultural material.

A recognition of this fact is important just now. The State Department continues slowly but none the less seriously, its negotiation for more trade agreements. Tariff concessions which we make, and bettered trade opportunity which we expect, must take account of this fact if the fullest benefit to America is achieved.

Stronger pressure in this direction should be exerted now. Congressmen whose districts include food-processing plants should be better informed and be urged to share their information with the State Department and the President. No one gets anything at the Washington pie counter unless he elbows his way forward vigorously. And this is true more than ever in the tariff-trading attempts of the New Deal.

End the Uncertainty

WITH everything else to bother Congress there is less and less chance for passage of the Food and Drug Bill in this session. Food manufacturers would serve their own ends well to press their Washington representatives for its early passage.

If further obstacles arise from sources outside the food field it appears that the best thing for the food industries will be a complete legal separation of Federal control of foods from all other materials.

Works Both Sides of the Street

IN UNITY there is strength—reads the old copybook maxim. True, but in the legislative field this principle must be applied intelligently if progress is to be sane and sound. Organization by industries and by trade is effective in gaining access to the front page of the daily press, and for presenting a united opinion at hearings before legislative committees. But when the senators and representatives vote on the floor of their respective houses, they usually vote for what they believe to be the predominant wish of the folks back home—not what some national industrial group may desire.

A united front for industry is necessary in 1936, more than ever before, but business men should remember that they themselves are also voters and should act as such. A voter is a personalized force, either friend or foe. Corporations and associations are impersonal forces and have little personal influence on a congressman's vote; their force is greatest in committee.

Business men must present their views jointly and severally to the va-

rious legislative bodies of this country. In other words, they must work both sides of the street, through national associations and again directly as individuals.

Insulated and Refrigerated Bodies

ONE of the most significant trends in the use of automotive equipment in the food industries during the past year has been the increasing use of insulated or refrigerated truck bodies.

Some concerns have utilized insulation alone, but most of them have gone the whole route and, in addition to insulation, have added some method of refrigerating the bodies. Despite its increased cost the latter equipment, capable of maintaining a predetermined temperature, has been added even though the refrigerating system is needed for only a portion of the year.

In justification for this added expense these concerns reason that the initial cost is lost to sight when the depreciation is spread over a five to ten-year body-life. This, plus the fact that when temperature control is needed it is needed, and there is no ready substitute for temperature control.

Water ice, salt ice, dry ice, cartridges, brine, gas and chemicals have all been used depending on the temperatures needed and the amount of absorbed heat to be removed. Further developments of these different systems can be looked for in the future.

By employing adequately refrigerated bodies the whole array of perishables—fresh meats, prepared meats, butter, cheese, fruits, vegetables, fish and the like can be delivered on long or short hauls in much better condition than without refrigeration. Bread may some day be added to this list.

Though practically all existing truck-body systems of temperature control are designed to hold the internal temperature lower than the outside temperature, future developments may be of the opposite character. We may conceivably see heated trucks tested for the delivery of oven fresh bakery products, although the chilled system seems to hold more promise. But the heated truck will have its place in preventing the freezing of perishables in extreme weather.

Time for a Change of Heart

THE times are different today than they were even a few years ago. They call for an approach to our problems and responsibilities with a psychology wholly different than before.

DOG-TO-DOG DELIVERY

It may sound silly, but the quicker the products of Canine Catering Co. go to the dogs the sooner the company makes a profit. So this concern pampers pets residing within a 75-mile radius of Philadelphia with a daily delivery service. Four panel-body trucks travel the bow-wow route, each traveling 125 to 150 miles a day. Advertising posters on the doors promote sales, these being changed twice monthly.

For several years past anyone who could say "No" to all proposals for expenditures was the man usually in greatest favor with the board of directors. Particularly in some large companies, where requisitions have to pass across the desks of many persons before a purchase order can be made out, the habit of saying "No" has become so ingrained that seemingly nothing can get by.

To say "No" is proper only when "No" is the proper answer. But how many times is it the right answer to a plant man's request for needed equipment or supplies? A man sitting in the executive offices may have the moral right to veto an expenditure if the company does not have the necessary money with which to make the purchase or when he knows more about the actual need for it in the plant than the man who started the requisition. But he cannot be certain of his ground in the latter case if he never gets into the plant. A new approach is needed today. Profits will be made by aggressive action—not by sitting tight.

Low-Cost Production Advantages

IN SPITE of the raw material shortage, which has made for higher unit manufacturing costs; in spite of its small size, which put it at a distinct disadvantage with respect to its larger competitors, there is a small meat packing plant in the Middle Atlantic seaboard which has come through the last two years of trouble with profits instead of losses.

All of this has been accomplished at a time when many plants of similar size were almost forced out of business.

There is no secret about its method of making profits instead of losses. In 1933 to 1934 the company bought much new low-cost production equipment—to lower costs, not to replace worn out equipment. Low-cost production will do more to guarantee profits than highpressure salesmanship.

Problems Ahead

AS A RULE management in the food field is not much experienced in the handling of major labor problems. A few pointers on this subject gained from an experienced employer appear to us to be worth passing along.

1. Be sure to have personal contact with a sufficient number of your employees to be positive you know their true sentiments.

2. In case of a real problem, take the steps necessary to ascertain what the employees themselves actually want. Employees have been known to be intimidated. A secret ballot may be necessary. Management must have enough fight and backbone to back up its own employees against racketeers if that unfortunate need should develop. As one employer has put it "There is nobody to protect the working man."

3. If it is impossible to meet the demands of employees, it may lead to a strike. A resolution from the board of directors of the concern will empower management to use its own judgment, if it actually comes to a strike and a fight is desirable. Otherwise management goes into the encounter with its hands tied.

It is to be hoped that no trouble will arise that will be caused by inept chiseling or selfish management. The

next few months will reveal who are and who are not good employers.

Uniforms to Foster Self-Respect

WHO can deny that it is much easier for an individual to be alert, polite and amenable to discipline when clean, well-dressed and properly shaven, with hair well cut? Veteran officers of the A.E.F. knew this when they insisted that their men must shave regularly even under combat conditions. Its moral effect on grouchy and unruly dispositions was marvelous.

We, ourselves, believe in it so strongly that were we the head of the Police Department in several cities where taxi drivers are nothing short of hard-boiled thugs, we would require that every driver wear a clean collar and necktie and be clean-shaven as a means of developing self-respect.

Some food manufacturers also realize the moral effect of proper attire and put all of their employees into trim-looking uniforms even though no visitors are ever permitted inside the plant to be impressed by the good-looking appearances. Also they require their employees to take shower-baths and provide them with excellent shaving facilities.

Discipline has its place to be sure, but there is nothing that is a substitute for self-respect in organization morale.

Patenting Old Stuff

CURIOUS discoveries are often made by those who closely follow the Patent Office Gazette and are well acquainted with industry. Often a new patent has been issued on an old product or process. We ourselves once made such an observation about four or five years ago when we found that a small meat packer had received a patent on a meat curing process that to our best knowledge had been in constant use by another company for considerably more than ten years.

Naturally such a situation can become most vexatious for both parties in case the patentee discovers that the other outfit has long been using his patented method, and refuses to recognize the validity of the patent.

Such anomalous situations are rare in the history of a single individual or one firm, but they happen often enough in this country to attract attention. Their very existence is often traceable to secrecy or merely undisclosed information. Patent examiners always do their utmost to ascertain the novelty of an alleged invention but there are limits beyond which even a patent examiner cannot pass.

Manufacturers of all sorts can help to protect themselves and furnish material aid to the Patent Office if they will supply it with duplicate copies of technical bulletins, catalogs, circulars, and the like, as well as specially prepared bibliographies, digests and summaries. With information of this sort available the Patent Examiner is much less likely to grant a patent on a reinvention.

Riddle

ONE plant superintendent has been requisitioning some new valves for over two years and never has been able to secure the necessary approval. Recently, however, by a queer turn of fate he got the new valves and finds that they are saving their cost every four weeks.

Just what amount was saved by deferring their purchase for two years?

Taste and Tonsils

THOSE men upon whose judgment and sense of taste depends the maintenance of flavor in foods will find a startling revelation in the experience of a flavor and perfume chemist, Frederich W. Heine of Compagnie Duval. He is reported to have realized that his sense of taste was not functioning as delicately as usual. After consultation with nose and throat specialists he decided to have his tonsils removed. Is this the answer to tasting difficulties?

Food Poisoning

ANOTHER outbreak of food poisoning occurring recently in an eastern city has been traced to custard-filled pastries. Though more than 100 persons were made ill there were no fatalities. Once again, *Staphylococcus aureus,* an ordinarily harmless micro-organism when it is on the exterior of a normal human skin, has been implicated. However, *S. aureus* is only one of many organisms that can cause food poisoning.

It has been demonstrated in San Francisco that custard-filled pastries can be made safe by proper sanitary precautions.

A sanitary discipline of suitable rigidity can be set up in any food industry if the production department knows how to do it. But it is questionable if such a discipline can be developed unless there is someone immediately concerned who knows his bacteriology and the methods by which bacteria may be transferred—and how infection of foodstuffs may take place.

It is imperative to keep perpetually in mind that *Staphylococcus aureus* comes from human contacts—nowhere else.

Harris & Ewing

THEY FOUND A SUBSTITUTE

They look pleased, these congressional and administration leaders, and perhaps they are. They have just reached an agreement on the fundamentals of a soil-conservation program to replace the outlawed AAA. Snapped as the men left a White House conference with President Roosevelt the picture shows (front row, left to right) Attorney General Homer S. Cummings, AAA Administrator Chester Davis, Secretary Henry Wallace, Senator Ellison Smith, Senator Joe Robinson (spokesman), Representative Marvin Jones and Speaker Joe Byrns, Senator John H. Bankhead II is to the right and back of Senator Robinson.

AAA Is Dead...What Next?

AN EDITORIAL

AGRICULTURAL problems are of fundamental concern to the food industries. All new attempts to solve the farm problem are, therefore, worthy of intensive study. New proposals are numerous and visionary.

The concern of the food processor extends far beyond the problem of processing taxes or other substitutes. Any farm relief measures are going to effect the cost of agricultural products which are the raw material of our industries. The production superintendent as well as the chief executive is involved because changing prices of raw material are likely to upset former sound relationships between the various items of the factory budget. Even if our industries escape processing taxes, we shall not escape other consequences of farm relief methods which succeed enough to do any group of farmers any important service.

Heated discussion of the Supreme Court opinions has little merit. The American people will abide by the majority finding. But new plans will be formulated instead of the old unconstitutional AAA. It is with them that we should now deal both because of immediate business concern and because of our civic duty as thinking citizens.

In its simplest form the problem is to curtail agricultural production. This sounds easy. But the social consequences of all the methods which have yet been proposed are so far reaching that no scheme yet devised stands the test of realistic impartial scrutiny. Some combination of schemes may help. But whether they will help or not, we can be sure they *will be tried*.

PURCHASE of acreage merely to reduce crop production might seem simplest of all. And, certainly the Federal Government has the right, if it chooses, to buy agricultural land from willing sellers. With the cooperation of states, it probably could acquire land even from the unwilling, if that were necessary or politically expedient, which it is not. But, to accomplish the desired result by this means would require at least the following actions:

1. Buying of 50 million fertile acres; or the buying of low-grade land in correspondingly greater acreage.

2. Provision for the new employment or subsistence of the owners of the land purchased and their families, some millions of persons.

3. Provision for the care of this land so that it would not become a menace to surrounding territory, by weed growth, for example.

4. Restriction of production on the unpurchased acres, probably an impossible goal.

Control of land fertility for the benefit of the population of the future is a desirable end of great importance. This objective fully justifies the erosion control programs often proposed, possibly even the effort to accomplish some of the needed farm relief through erosion-control methods. Unfortunately, however, all sound and convenient procedures of this sort increase the prospective yield from lands, except the program of reforestation. Logically, therefore, we cannot expect much from the erosion philosophy.

One could proceed to discuss each of a score of other programs that have been considered in Washington. In each would be found serious defects and in each much of doubtful constitutionality. Of course, not all unconstitutional actions are easily restrained. For, to secure Court action, there must be some one who has a legal right to go into the Court for injunction or other relief. The Supreme Court, no matter how willing, does not adjudicate a case until it comes up to it through legal channels clearly provided by law. Hence mere unconstitutionality of detail may not be fatal for a new program.

THE food industries must continue to study these problems. Most important, they must determine what prospective new costs mean as to plant methods. Higher raw material cost seems inevitable. There must, therefore, be new management effort in operation to cut processing costs. A low-cost factory, mechanized to the peak of efficiency, is the only safe companion for rising raw-material prices.

In all of these matters, the food industries have more than mere concern. They have a real responsibility. The burden on the general public imposed by increasing agricultural material prices, should be softened as far as possible. The food processor, by setting up the low-cost factory, renders a social service to the public, as well as increases his own opportunity for legitimate profit.

Feeding the CCC

A Big Market for Food Manufacturers

SUPPLYING food for 500,000 or more CCC men, divided into 2,427 separate camps, is a task that might be expected to tax even the trained personnel of the U. S. War Department. However, thanks to a vast fund of experience acquired over the years, and particularly during the World War, the Quartermaster Corps of the Army has solved this problem in such a way that wholesome, attractive food is supplied in liberal quantities to each man three times daily, at the highly economical figure of $12 per month per man, or about 13⅓ cents per meal.

Purchases of food are based on the U. S. Army ration, adopted by the War Department in 1932. This ration consists of the components shown in Table I, which are the allowances of food for one man for one day.

This diet has been chosen as one that is properly balanced and serves to keep the men in a condition of satisfactory health. Official records of the Surgeon General of the U. S. Army show that members of the CCC register gains in weight of from 7 to 12 lb. during their first two months.

In procuring food for their camps, commanding officers are not restricted, wide latitude being permitted in the substitution of other meats, vegetables, fruits, etc., for those specified in the standard ration. Based on the standard ration, the quantities of different foods used during a 30-day period for an enrollment of 500,000 men, has been estimated by the Quartermaster Corps to be as shown in Table II.

One aid to economy in these purchases is that the procurement is consolidated with that of food for the regular army. Therefore, assuming 500,000 men in CCC, and approximately 125,000 men in the army, the total purchases are made for 625,000 men instead of 500,000, which permits many purchases to be made in relatively larger quantities. Perishable supplies are purchased in accordance with arrangements made by the commanding officer of each Army Corps Area, while non-perishables are obtained by the Army purchasing depots.

Table I—Standard CCC Ration per Man, per Day

Article	Quantity		Article	Quantity	
Meat:			Beverages:		
Bacon	ounces	2	Coffee, roasted or roasted and ground	ounces	2
Beef, fresh	"	10	Cocoa	"	.3
Chicken, fresh	"	2	Tea	"	.03
Pork, fresh	"	4	Milk: (2)		
Eggs, fresh	each	1	Milk, evaporated	"	1
Dry vegetables and cereals:			Milk, fresh	"	8
Beans	ounces	.5	Lard:		
Rice	"	.6	Lard	"	.64
Rolled Oats	"	1.5	Lard substitute	"	.64
Fresh vegetables:			Butter	"	2
Beans, string, canned	"	3	Flour, wheat	"	12
Corn, canned	"	2	Baking powder	"	.09
Onions	"	2	Macaroni	"	.25
Peas, canned	"	2	Cheese	"	.25
Potatoes	"	10	Sugar	"	5
Tomatoes, canned	"	2	Cinnamon	"	.01
Fruit:			Flavoring extract	"	.02
Apples, canned	"	1.5	Pepper, black	"	.04
Jam or preserves	"	.5	Pickles, cucumber	"	.16
Peaches, canned	"	1.2	Salt	"	.5
Pineapple, canned	"	1.2	Sirup	"	.5
Prunes	"	.3	Vinegar	"	.16

Table II—Food Required Each Month for CCC Enrollment of 500,000 Men

Article	Unit	Quantity	No. of carloads 80,000 lb. capacity
Bacon	Pound	1,875,000	27⅓
Beans, dry	"	468,750	5⅞
Beef	"	9,375,000	426¼
Butter	"	1,875,000	78⅛
Cheese	"	234,375	4⅛
Chicken	"	1,875,000	78⅛
Eggs	Each	15,000,000	50
Flour	Pound	11,250,000	141⅜
Lard	"	600,000	10
Milk evaporated	No. 1 can	1,034,475	16⅛
Milk, fresh	Gallon	937,500	116⅛ (tank cars)
Onions	Pound	1,875,000	24⅛
Pork	"	3,750,000	170
Potatoes	"	9,375,000	145
Rice	"	562,500	7⅛
Sirup	No. 10 can	54,735	7⅛
Sugar	Pound	4,687,500	59⅛
Apples	No. 10 can	234,375	25⅛
Baking powder	5 lb. can	16,875	1⅛
Beans, string	No. 2 can	2,368,410	45⅛
Cinnamon	4 oz. can	52,500	⅛
Cocoa	5 lb. can	56,250	6⅛
Coffee	Pound	1,875,000	61⅛
Corn	No. 2 can	1,500,000	30
Flavoring extract	8 oz. bottle	37,500	⅛
Jam or Preserves	No. 2 can	312,495	7⅛
Lard Substitute	Pound	600,000	10
Macaroni	"	24,375	6⅛
Peaches	No. 10 can	167,160	18⅛
Peas	No. 2 can	1,500,000	30
Pepper	4 oz. can	150,000	⅛
Pickles	Gallon	18,750	2⅛
Pineapple	No. 2½ can	600,000	20⅛
Prunes	No. 10 can	41,655	5
Rolled Oats	20 oz. package	1,125,000	48⅛
Salt	Pound	468,750	5⅛
Tea	"	46,875	3⅛
Tomatoes	No. 10 can	300,000	33⅛
Vinegar	Gallon	18,750	2⅛
			1,737⅛

Stainless Steel, Nickel, and Nickel Alloys Solve Food Equipment

Fabricator's Problems

By GEORGE H. TAY
General Manager, Lee Metal Products Co., Philipsburg, Pa.

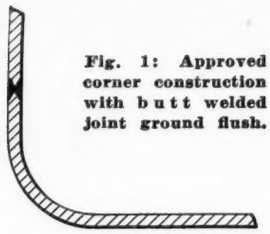


Fig. 1: Approved corner construction with butt welded joint ground flush.

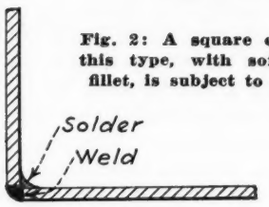


Fig. 2: A square corner of this type, with soft solder fillet, is subject to repairs.

DURING the last ten years, food manufacturers, in improving their products, have demanded machinery and equipment that reduces the hazards of contamination as well as increases production. They have been willing to pay increased prices for product protection and for speed; but they have also demanded longer life, and freedom from repair and replacement expenses, for the equipment. To meet these demands, it has been necessary for machinery and equipment manufacturers to use the so-called non-corrosive metals.

These metals can be grouped under two heads: Stainless Steels; and Nickel and Nickel Alloys.

In the stainless steel group there are numerous alloys which have been developed to meet special purposes, but for food use we need only consider what is known as "18-8" alloy —commonly called stainless steel. This has been standardized by various steel companies to contain 17 to 20 per cent chromium, and 7 to 10 per cent nickel, alloyed with iron.

Pure nickel is what the name implies, having less than 1 per cent of impurities. There are numerous nickel alloys, the most widely known and used being Monel Metal, which contains approximately 67 per cent nickel and 33 per cent copper.

By the use of one of these three metals, nearly every food processing problem can be met. For some products, all three are suitable, the choice being governed by such factors as the price and time of delivery. For other products, only one, or possibly two, can be used, and the choice depends entirely upon the chemical analysis of the product. Among the food products being successfully processed in equipment made from these metals are apple products, berries, breakfast cereals, cheeses, cream sauces, cherries, chocolate products, cranberries, candy, fish products, fruit preserves, fruit extracts, grape preserves, grape juice, ice cream, milk products, mayonnaise, mushrooms, meat products, meat soups, pea brine, pineapples, sphaghetti sauce, salad dressing, spinach, tomato products, vegetable soups, vinegar, vinegar products.

IT IS not the purpose of this article to list the metal for each item of food, but, generally speaking, the use of stainless steel is preferred for fruit acid products, and pure nickel or Monel Metal for brine products. Either stainless steel or pure nickel can be used for foods that do not approach either of these extremes too closely. Monel Metal is preferable for use with fish products and is used extensively in the chocolate industry.

All three metals will last indefinitely in their fields if properly constructed, and require no repairs or replacements. They are considered as permanent investments.

So much for the suitability of these metals for use in food equipment. The construction of equipment from these metals must next be considered, as certain fundamental principles must be followed or the life-long qualities will be sacrificed.

The most important food equipment may be classified as containers, a class made up of plain tanks and jacketed tanks. Plain tanks may be of any capacity or shape, ranging in size from a few up to several thousand gallons. Jacketed tanks include steam-jacketed kettles, water or brine jacketed tanks, vacuum pans, etc.

The first rule for construction is that the container must have a smooth, seamless interior surface. It may be made from several pieces, but, if so, these should be butt-welded and the welds ground flush with the sheets. If the sheets used in the construction are not ground free of oxide before fabricating, the entire inside surface should be ground after welding. The second rule is that all corners must be rounded, as in Fig. 1, and that no weld should be made in a corner where it cannot be ground, as that would make it necessary to flush with solder (see Fig. 2).

Containers, as a rule, should not be made of lighter than 16-gage metal. This is because the welding of lighter gages is difficult and uncertain. Lighter than 16-gage metal may be used by lock-seaming and soldering, if the metal is nickel or Monel Metal; but this construction should not be used with stainless steel. Stainless steel should never be soldered, as the flux is generally high in hydrochloric acid and continues to attack the metal under the solder until it is eventually eaten through (see Fig. 3). It may take a long time for this to show up in service, as it is not apparent until the leak occurs.

It is bad practice to use solder on the inside of any container made from these metals. Solder is not a long-lived alloy and will make trouble in a comparatively short time. Tanks that should be permanent installations will be subject to repairs and perhaps serious loss of product if soldered joints are permitted. It is false economy to install a tank made from an expensive metal with inferior joints in order to save a few dollars.

Riveting is another type of construction that should be condemned. With modern welding facilities, it is no longer necessary with any of these metals. Riveted joints and rivet heads must be soldered in order to be

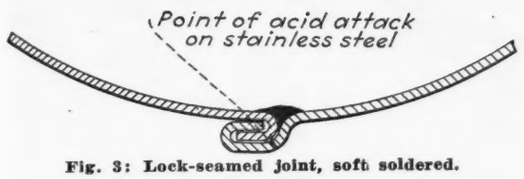


Fig. 3: Lock-seamed joint, soft soldered.

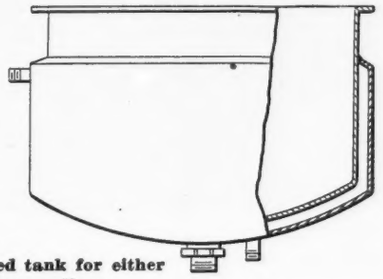


Fig. 4: Jacketed tank for either heating or cooling.

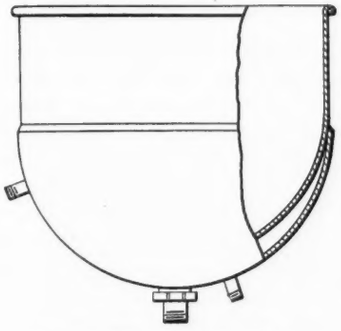


Fig. 5: Steam jacketed kettle, used for heating only.

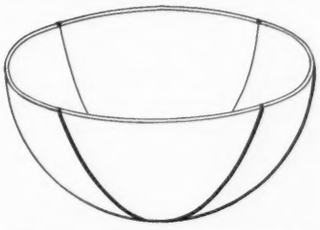
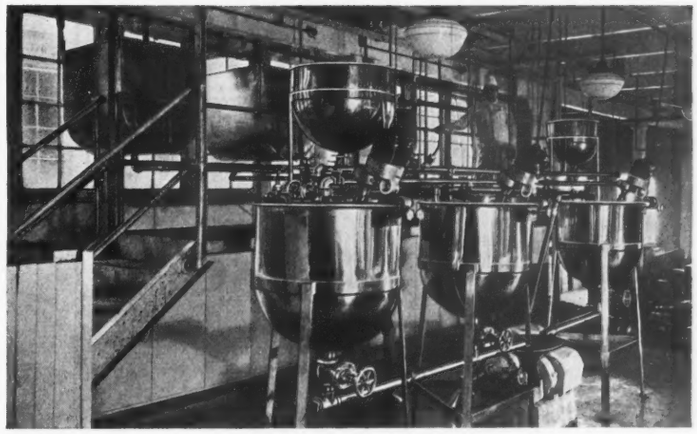


Fig. 6: Type of construction used in fabricating welded bowls for steam jacketed kettles.



This mayonnaise manufacturing department is equipped throughout with highly polished stainless steel.

sanitary, which invites future repairs.

The construction of a jacketed tank (see Fig. 4) embodies the same principles as already outlined in regard to weight of metal, corners, welding, and so on. Tanks made from all three metals may have boiler-plate jackets, if desired, in order to reduce the initial expense. It should be understood, however, that such jackets will be subject to replacement, sooner or later. Their life will probably be that of the ordinary steam boiler, and they can be replaced.

More consideration must be given to the selection of metal for jacketed tanks that are to be used for cooling than for those where heating only is contemplated. All three of these metals are suitable for steam heating, so for heating applications, adaptability to the product is the only consideration. With the cooling tank, however, the cooling medium, as well as the product, has a direct bearing on the metal selection. Stainless steel should not be used with a brine cooling system, and should the product require this metal, only cold water can be used. Neither pure nickel or Monel Metal are affected by brine, and, if the product can be handled safely in either of these metals, more efficient cooling can be obtained.

Jacketed tanks are not generally constructed to stand over 60 lb. per sq.in. working pressure, as the thickness of metal required in the body to withstand higher pressures retards the heat transfer and slows down the cooking.

Jacketed kettles (see Fig. 5) can be built to work efficiently with high steam pressures. The bowl shape of the jackets allows the use of comparatively light metal with high pressures. It is possible to fabricate small, seamless bowls by pressing. These, if properly annealed, will give satisfactory service. The larger sizes, however, must be made from more than one piece, owing to the size limitations of metal sheets, and also of press capacities.

Such bowls are made from one or more sheets, cut to form and welded (see Fig. 6). The forming does not work-harden the pieces nor set up uneven strains, as is the case in drawing; and annealing is not required, either before or after welding. When the welds are ground smooth, and the bowl polished, it is hard to detect where the welds were made. The outer jacket may be made of the same material as the inner jacket, or of boiler-plate, and welded to the inner jacket. The cylinders and outlet pipes are welded to the inner jacket and the finished kettle is seamless, without rivets and free from all metal strains.

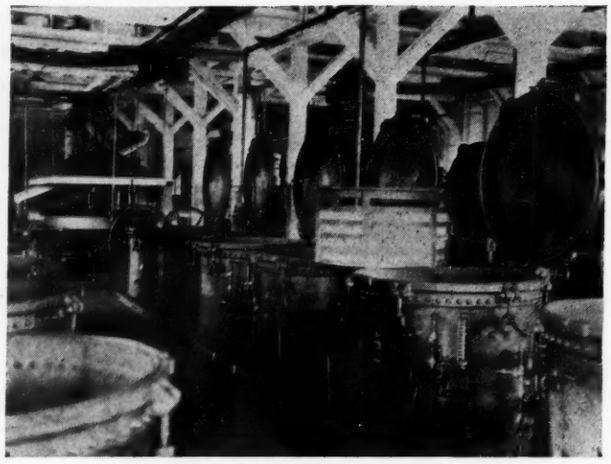
THE problem of metal selection at the present time rests largely on the fabricator's shoulders, as he has done the pioneering work and has a background of experience to guide him. In checking up on the comparatively few failures reported in these three metals, in nearly every instance the trouble can be laid to the selection of the wrong metal, or to too light construction. These metals and their uses are now pretty well established, and, if the proper amount of caution in the selection and welded construction is adhered to, there should be little danger of failures.

Numerous other pieces of equipment used in the food industries, including tables, baskets, heating coils, etc., are obtainable in these metals. The same principles apply to their selection. No finer, safer, or more economical equipment can be obtained. If the product handled is a very active corrosive agent, the contacting surface should have a high polish. Otherwise, the fine, satin grind finish is satisfactory. To really reach the height of sanitation, containers should be polished on the outside and mounted in polished stands of the same metal (see Fig. 7). When a manufacturing department is equipped in this way, it is a credit and insurance to any firm handling food and, where visitors are welcomed, the slightly increased initial cost is more than offset by the advertising value.

"Corn Shops" Down in Maine

PART II

By L. V. BURTON
Editor, FOOD INDUSTRIES



These round retorts in a Burnham and Morrill plant are fully equipped for cooling No. 10 cans under pressure.

NEW methods of preparing and handling the raw materials for canned corn are being developed by Maine canners. The impetus for the new development arises from two sources: (1) The economic necessity of securing a lower unit cost for overhead by putting a larger volume through the plant without materially increasing the fixed investment; (2) the necessity of adapting the style of output to the demands of the trade.

In the latter case, the trade is taking increasing amounts of its canned corn in No. 10 cans which have a volume capacity of about $\frac{5}{6}$ gal. Packing any product in this size of can, where the nature of the product requires sterilization under pressure, imposes more exacting processing requirements than are necessary when smaller cans are employed. For example, very accurate temperature control during processing is required to avoid straining the cans themselves by variations in the differences between the internal and the external pressure of the cans.

Furthermore, the cans ought to be cooled under pressure to avoid the possibility of rupturing them during the initial stages of cooling. This condition of cooling is desirable, because the cans may be processed at about 15 lb. per sq.in. in the retort and, when the retort pressure is blown off, each can will have an inside pressure of about 17-20 lb. per sq.in. and no outside pressure to compensate it. As ordinarily constructed, the commercial No. 10 can is not sufficiently strong to withstand such an internal pressure with safety to the seams. Furthermore, the more air present in the can, the higher the internal pressure will run above the retort pressure because of the expansion of the air.

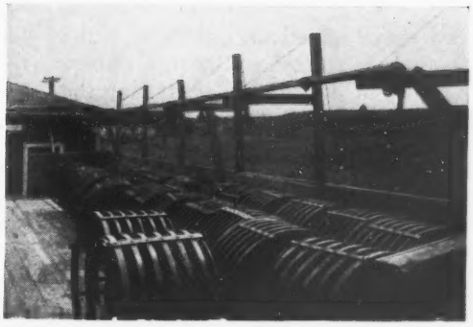
There are a few canners in the country who sterilize No. 10 cans by the "step-down" system of processing, and thus are able to eliminate some of the problems of pressure cooling. The majority, however, seem to hold the opinion that without cooling under pressure, the No. 10 can of corn is a commercial impossibility. When the processing and pressure cooling of No. 10 cans are carried out under the most highly mechanized conditions it entails the use of adequate control instruments and a certain addition to the fixed investment for the cost of the instruments. All of which indicates the need of greater volume through the more expensive equipment if overhead unit costs are to remain constant. Whether motivated by this reason or by the ordinary necessities of business, many Maine canners have sought to increase the volume of goods processed in their lowest-cost plants by bringing prepared raw material to central canning plants.

In the outlying plants, the principal function is to husk and silk the corn, cut it from the cobs, and place it in 40-qt. milk cans for hauling to the plant where the final canning is done. Such "shops" are locally termed "cuttin' shops."

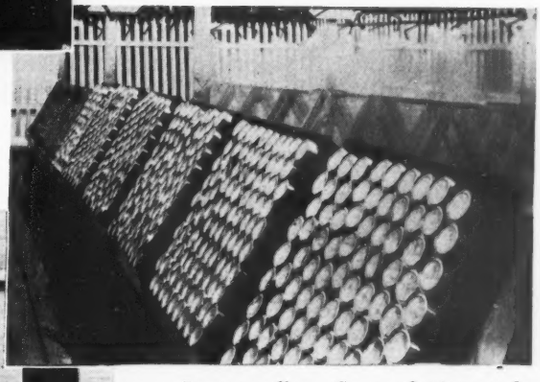
NO OTHER technical question aroused so much animated discussion on this trip of mine around the state of Maine as the pros and cons of "cuttin' shops" and there was no uniformity of opinion. An exponent of one school of thought was opposed to shipping cut corn on the principle that it had a peculiar flavor, whereas 10 miles away would be another man who believed that cutting shops were the answer to all of the possible economic ills of the Maine corn canning industry. One very enthusiastic gentleman who appeared to be a "yardmaster" assured me that his concern was developing a portable cutting shop that would go from field to field to cut the corn on the spot, and ship it all to the central canning plant. As he described the new development to me, he became quite enthusiastic. "Indeed," he exclaimed, "we shall both live to see the day when not only the cutting but also the canning will be done in the field."

To understand the biochemical problems introduced by the use of the cutting shops, it is necessary to understand that sweet corn is a living thing. When it is cut from the cob, it is severely bruised and mangled, an injury that sets into action some of the enzymes in the kernel which are believed to have the function of attempting to heal the injuries. Furthermore, the corn is still respiring, which means that sugar is being converted into carbon dioxide and that a certain amount of heat is being given off as a byproduct which cannot readily escape. If the amount of heat developed should raise the temperature of the mass of cut corn it will accelerate all of the changes that are then going on. A mass of raw, cut corn in a 40-qt. milk can or in a cream can on a hot day en route from a "cuttin' shop" to a canning plant is bound to undergo some changes that will be more or less noticeable unless

This is a canning plant, not a dairy. The milk cans are for transportation of cut corn to another plant for final canning. One lot of about 40 filled cans are standing upright in the shade ready for trucking elsewhere. The others are empties.



This plant at Winslows Mills uses round retorts but cools on the spray platform, using a somewhat different style of spray heads from those shown below.



Spray cooling. Some plants merely sprinkle the hot cans with a hose and allow them to remain over night. Cooling water drains through floor to the ground. This plant has frames built under the multiple spray heads so that one valve will control the cooling of a whole line of filled bath pans. The fence is to prevent thefts at night.

Burnham & Morrill at Center Fryeburg cools cans in tank (left) equipped with a mechanical conveyor for moving crates of cans through the water.

something is done to prevent it. Bacterial action is only one of the possibilities. Enzymic action is probably much more important.

Evidence that was discernable by a layman, to the effect that something unusual occurs in transit, was found in the slight amount of foaming en route that was reported by several superintendents. Some concerns have attempted to restrain these changes and have experimented with some means of cooling it below the temperature where such biochemical changes may take place. Opinion in Maine seems to be that between 55 and 45 deg. F. is a safe temperature. It was reported that one or two concerns had tried placing three 2-lb. pieces of ice in the cut corn in a 40-qt. milk can, but had abandoned it as ineffective or else as too costly.

A milk can of 40-qt. size holds about 93 lb. of cut corn when it is full. Corn has a specific heat of about 0.86. If it is necessary to cool the 93 lb. of cut corn from 72 deg. F. to 45 deg. F. with ice as the refrigerant, the amount of ice needed can be calculated by the following method:

$$\frac{93 \times 0.86 \times (72-45)}{144 \text{ (B.t.u. per lb. ice)}} = 13.7 \text{ lb. ice needed}$$

However, to add that much ice to a full milk can would run the corn over the top, so it would be necessary to put in less corn. And then a certain amount of ice would be needed to cool the heavy milk can itself from 72 to 45 deg.; and more would be needed to compensate for any heat that would be absorbed from the atmosphere during the period elapsing from first icing to the point where the corn is canned; and perhaps still more would be needed to compensate for any biological heat that might develop.

A further problem is introduced by the fact that the ice must melt to water to accomplish the foregoing cooling. And also it is necessary to have an excess of unmelted ice present to keep the corn as cold as may be specified, despite any theoretical deductions to the contrary. Refrigerating engineers understand this point very fully.

THE next problem arises as to how to remove the excess ice, for if it is not removed, then it will melt and may result in too much water in the cut corn for a satisfactory finished pack.

The fishing industry uses crushed

ice very effectively to keep the dressed fish fresh. But the fisherman has no difficulty in separating the fish from the ice when he delivers his catch. And in that industry, despite all attempts to utilize mechanical refrigeration, the only effective way that has been found to keep cold a large mass of fish is to pack it with alternative layers of crushed ice.

If "cuttin' shop" corn is to be cooled effectively, it would appear that some kind of mechanical refrigeration must be applied directly to the cut corn as it comes from the cutters unless, of course, the ears are naturally very cold, as often occurs in the late autumn. Something like a continuous ice cream freezer or a slush ice machine would cool it promptly, effectively and continuously to, say 40 deg. F. Cut corn at that temperature could be dumped into insulated cans, using jackets like ice cream can jackets for insulation, and its temperature would not be likely to increase sufficiently to do any harm during the next two or three hours. And this method would keep all added ice out of the corn.

Another suggested method that might be equally as effective would be to pre-cool the husked ears in refrigerated brine before cutting off the kernels. The brine would have a temperature slightly above the freezing point and thus the kernels would be refrigerated before they were cut off. Or a simpler method would be to chill the ears with ice water after the manner employed by some of the more progressive Florida celery shippers.

Whether these suggested changes in the method of cooling cut corn are worth the bother and expense or not is something that will require considerable research. And whether "cuttin' shop" practice will ultimately prove to be worth while for the industry will probably depend on the solution of the foregoing questions and on what can be done to restrain any biochemical changes that may occur in the interim between the cutting knives and the point where enough heat may be applied to the corn to inactivate the enzymes and bacteria.

THERE is some disagreement in Maine over the matter of proper cooling of cans after sterilization. The cans come from the retort at a temperature somewhere in the vicinity of 245 deg. F. or possibly higher. The majority seems to advocate platform-spray cooling, but there are a few who cool by submerging the hot cans in cold water.

Advocates of platform spray cooling argue that the composition gasket in the lid of a can is in liquid form when the can is hot from the retort, and that if a can is submerged in water, the condensation of vapor within it will cause a vacuum that will draw in contaminated water thereby causing spoilage. The second group appears to have the opinion that the first group would not find evidence to substantiate this theory if they would roll their seams more tightly and operate their closing machines as precision tools.

For small plants spray cooling permits a relatively economical installation, while cooling by submergence in cold water requires a water-tight tank and a mechanism to convey the cans in crates through the tank of water. However, the cost of operating the latter is probably somewhat lower than that of spray cooling because of the lower labor cost compared to the several handlings that may be needed on cooling platforms.

THE method of purchasing the raw material in Maine corn canning plants differs from that employed in other portions of the United States, and probably it has an important beneficial effect on the quality of the raw material received. Many other regions purchase sweet corn on the ear at a flat rate per ton, but not so in Maine. Here the practice is to pay on the basis of the amount of cut corn that can be obtained from a sample taken from the load and furthermore the price usually varies with the quality of the sample. But back of all this is the fact that the methods of harvesting in Maine are entirely different from those which are employed in the Middlewest. In Illinois, for example, when the field man says it is time to harvest a given field of sweet corn, it is picked clean. The field man's decision as to when to pick the field is based on the average of the condition of the crop. If any sorting of the ears is to be made to segregate different degrees of maturity, that sorting is done on belts in the factory. Old mature ears and young blisters are thrown out. The success of this method depends largely on the uniformity of the rate of growth and the maturing of the crop. It also means that plantings must be made successively so that harvestings can also be made successively.

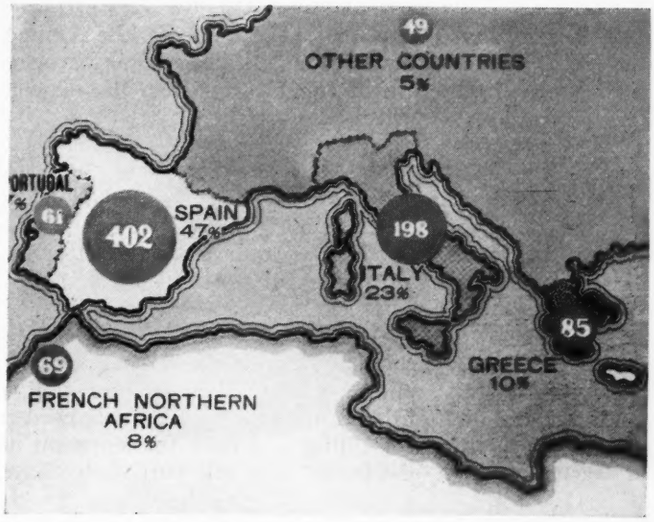
In Maine, however, cornfields are picked over several times, each picking being made with the idea of getting only the ears that, in local parlance are "up," *i.e.*, up to the right stage of maturity for canning. Thus the system of purchase based on a rate per pound of cut kernels, depending on the quality, is an incentive to a farmer to bring in the crop at its ideal stage. Many of the Maine corn shops have small laboratory-like cutting departments in which the test is made, the weight of cut kernels obtained, and the rate of pay fixed.

Most concerns pay for corn on the basis of 2¼ cents per pound of cut kernels. Sweet corn in Maine will produce about 20 lb. of kernels per 50-lb. bushel of corn in the husk. If 50 per cent or more of the ears are in the milk stage, the corn is packed as whole-grain or whole-kernel corn, but if it runs less than 50 per cent in the milk stage, the corn is packed as cream style corn.

IT WAS reported that some Maine canners are trying out the U.S. grade system of purchasing, but I did not come across it. Under such a system, the ears suitable for canning are selected from a 50-lb. sample. This requires husking and culling after which each ear is tested for maturity by the well known thumbnail test. If 50 per cent or more of the ears are in the milk stage, the price to the grower is $26.50 per ton of "can-able" husked, culled ears; while if it runs only from 20 to 50 per cent in the milk stage, the price was said to be $24.40 in 1935.

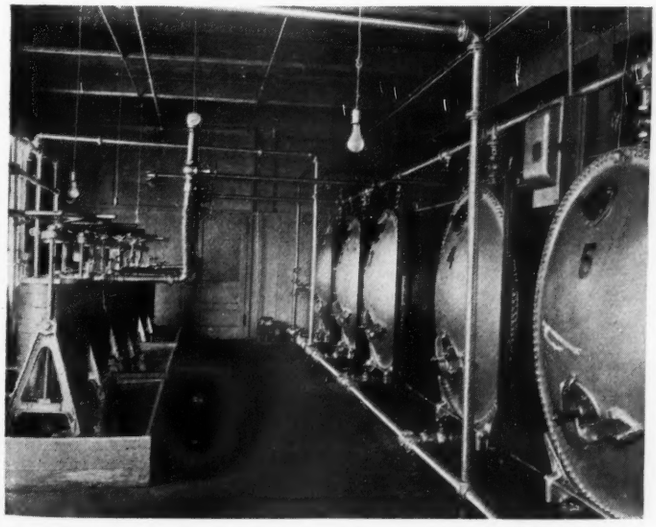
Most Maine corn canners do not favor the U.S. government system of compensation as well as the state system of paying 2¼ cents per lb. of kernels for the reason that it affords less incentive to the farmer to do his utmost to produce the very best of quality. Adequate fertilization of the soil, according to several canners, will increase the "test" of the corn. That is, it will apparently result in deeper kernels and a greater return to the grower than corn which has been less well fertilized. Also it results in greater profits to the canner.

Most of the canners are offering the growers an added inducement for quality by offering a bonus of 10 per cent over the basic price of 2¼ cents per lb. when the corn is of such a quality that it can be packed as whole kernel corn. In other words, if it tests over 50 per cent in the milk stage, the grower gets nearly 2½ cents per lb. of kernels.



Yearly average of production in the principal olive oil producing countries from 1927 to 1931. Figures indicate millions of kilograms.

Receiving olive oil in tin-lined steel drums. Weights are being checked by customs inspectors.



Filtering the oil through five layers of paper to remove any traces of solids which otherwise would cause it to deteriorate rapidly.

Fine Filtration and Vacuum Protects

Olive Oil in Storage

By L. A. PELTON

General Manager, Pompeian Olive Oil Corp., Baltimore, Md.

OLIVE OIL, in contrast to many vegetable oils, becomes an inferior product when subjected to the so-called refining processes or chemical treatment so commonly used by vegetable oil manufacturers. Refined olive oil is obtained from a very low grade of olive oil which must be refined before it is fit for edible purposes.

Hence the basis of the olive oil business is the procurement of the oil in as perfect quality as possible, and then maintaining it in that condition by suitable technical safeguards and procedure until it passes into retail trade, and to the consumer.

Refining of olive oil is impractical because the resultant oil after the refining process is a tasteless, odorless and colorless fatty mass.

Much confusion exists both in the grocery and drug industries regarding the difference between what is known as "virgin olive oil" and what is known as "pure olive oil." To explain the difference, it is necessary to go back to the source of the oil, the olive. The quality of the oil is necessarily dependent upon the cultivation and care of the fruit. The better olive oils are obtained from perfect fruit, ripened to maturity and picked by hand from the tree. All of the following discussion is confined to the foregoing class of oils.

Several pressings of the olive are necessary to obtain all of the oil that it is possible for the olive to yield. The first operation is that of crushing the olive to a coarse pulp. Then the pulp is placed in bags with small mesh openings, which is followed by cold pressing in a hand-operated press. The force exerted is approximately 4 lb. per sq.in., but varies somewhat according to the fruit. The first pressing yields about 25 per cent of the oil of the olive and this oil is the only true "virgin" grade of olive oil. The pits of the olive are not removed when the pulp is crushed, but, on the other hand, they are not crushed in the crushing machine nor are they crushed in the first pressing. If the pits are crushed it will add some bitterness to the oil.

The true "virgin" grade of olive oil thus extracted is golden in color, with a slight greenish tint, light in body and has a distinctive and pleasing flavor and

aroma. This grade is the very best grade of oil that the olive yields.

AFTER the first pressing, the pulp is placed in bags and put under hydraulic pressure of about 44 lb. per sq.in. The oil which is expressed from the pulp in this operation is much darker in color, heavier in body and is considerably stronger in flavor and aroma. In the trade, this oil is also called "virgin pure," but obviously it is of an inferior quality.

Some oil remains in the pulp after the second pressing which can be recovered by the use of steam under pressure. The pulp is removed from the bag, mixed with water, and then placed in a steam jacket kettle and cooked. The heat treatment releases considerable of the residual oil which floats to the surface and is drawn off. The mass is again pressed to recover additional oil. This constitutes the third pressing.

After the third pressing there still remains in the pulp between 8 and 10 per cent of the original oil, but this can be extracted only by use of organic solvents, such as benzine, carbon bisulphide or carbon tetrachloride. The latter is generally preferable because of its freedom from explosion hazards.

In the trade the solvent extraction process is frequently referred to as sulphur treatment, deriving its name from the fact that carbon bisulphide was the principal solvent in use in earlier days.

After the final pressing the pulp is nothing but a dry pomace, practically free of oil, and it is used as fuel for the generation of steam for use in some of the foregoing processes.

Oil from the third pressing is of a very dark green color, almost black, and of a flavor and aroma so strong as to be unpalatable. In fact it is inedible. This oil is known in the trade as "commercial olive oil" and of course sells very cheaply. In order to make this oil edible it must be chemically refined. Refining involves a chemical treating process and it removes color, taste, odor and free fatty acids, leaving nothing but a bland oil having the physical characteristics of olive oil but none of the flavor and color characteristics. The refined oil obtained by this process is then mixed with 10 to 20 per cent of its weight of a strong natural olive oil to give it the flavor and color approximating true olive oil. It is then sold at prices cheaper than true olive oil.

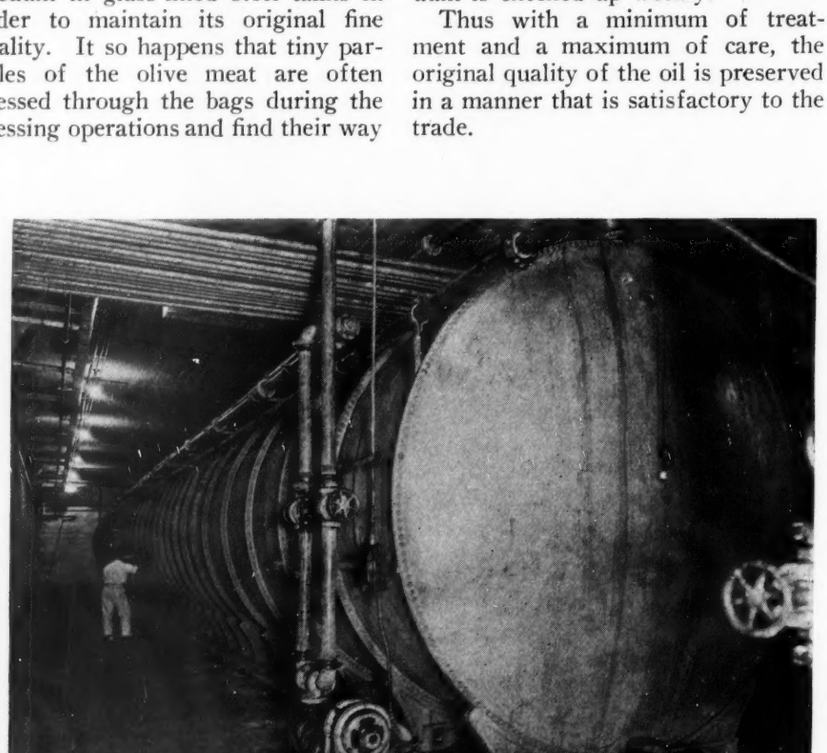
The element of "keeping quality" must necessarily become a part of any discussion involving edible oils and fats because rancidity and deterioration are the bugaboos of every olive oil packer. Proper storage conditions and proper filtration are the two factors of greatest importance for the maintenance of the original quality of olive oil. It is important to realize at this point that virgin olive oil has a merchantable life four or five times longer than chemically treated oil. To account for this longer life, the theory is advanced that the virgin olive oil contains some antirancidity factors that are removed by refining.

Our own practice is to purchase our requirements of oil in the four months—December, January, February and March. At this time of the year the oil is freshest and at its best. Special steel drums, lined with tin, weighing over 1,600 lb. each when filled, are used for transportation of the oil from the Mediterranean ports to our plant in Baltimore. As soon as the oil is delivered at our warehouse, it is necessary to filter it promptly and then store it under vacuum in glass-lined steel tanks in order to maintain its original fine quality. It so happens that tiny particles of the olive meat are often pressed through the bags during the pressing operations and find their way into the oil coming to the United States. Unless these fine particles are thoroughly removed, the oil will deteriorate rapidly.

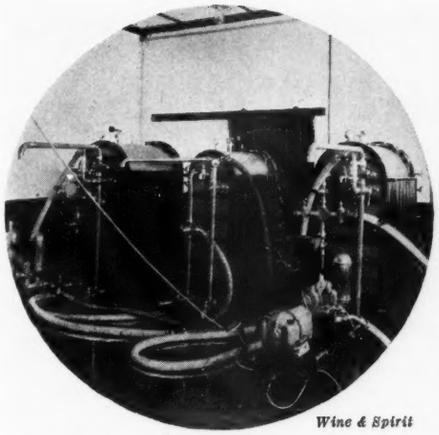
OUR procedure, therefore, involves the following routine: The oil is filtered through heavy paper filters in a plate and frame filter press, the filtering medium being five sheets of paper. This means that each drop of oil must pass through five successive sheets of paper, thus removing any minute solids. The next operation is to store it properly until it is needed for filling into cans for shipment to the trade. For this purpose we have a battery of glass-lined steel tanks, each having 60,000 gal. capacity, our total facilities of this character amounting to 1,250,000 gal. It represents, we believe, the largest storage capacity of its kind in the world.

To further prevent any deterioration of the quality of the oil, a 26-in. vacuum is drawn in the head space of each tank after filling it full, thus reducing very materially the tendency of atmospheric oxygen to combine with any constituent of the oil and alter the quality of the oil. The vacuum is checked up weekly.

Thus with a minimum of treatment and a maximum of care, the original quality of the oil is preserved in a manner that is satisfactory to the trade.

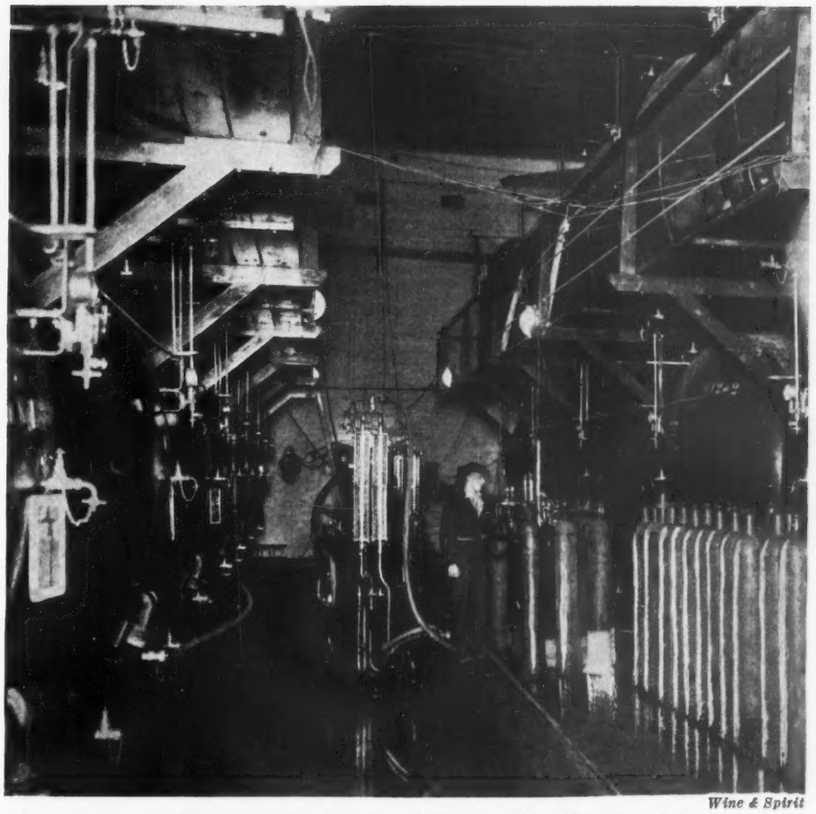


Filtered oil is stored in these 60,000-gal. glass-lined storage tanks. A high vacuum is drawn in the tank after it is filled to keep atmospheric oxygen away from the oil as much as possible. All valves are padlocked to avoid errors and losses.



Wine & Spirit

Seitz "E.-K." filters, used for removing micro-organisms from grape juice.



Wine & Spirit

View in grape juice storage tank room, showing carbon dioxide cylinders and gas pressuring pumps.

CO_2

*As an industrial Antiseptic**

Grape juice manufacture, as carried out by the Co-operative Wine Growers Association of South Africa, Ltd., avoids the necessity of pasteurization by holding the expressed juice under high pressure carbon dioxide until bottling

PASTEURIZATION, with or without the use of preservatives, was once the only method available for the large-scale manufacture of unfermented fruit juices. Without question, this process effectually preserves the product and, with certain juices, provides a means of producing a satisfactory bottled juice. Some fruit juices, however, are readily affected by the heating process, and flavors commonly called "cooked" are developed.

Unfermented grape juice is one of these products the flavor of which is injured by heat. Some method of preventing its fermentation, however, must be used, because fermentation will commence as soon as the juice is pressed from the grapes.

To avoid this difficulty, unfermented grape juice has come to be manufactured in Europe during the last twelve years by the "cold process" of the Seitz Works, Kreuznach, Germany, as developed by the author. In this process, the yeasts and other micro-organisms that cause fermentation or spoilage, are not destroyed by heat, but are removed completely by filtration through a "Seitz E.-K." filter which is fine enough to remove bacteria.

Filtering the fresh-pressed grape juice is not, however, as simple as it sounds. The juice contains sediment and mucilaginous substances, both of which would quickly clog such a fine filter. Therefore the liquid is first cleared of dirt and slime by filtering through asbestos in an ordinary filter. Finally it is put through the "Seitz E.-K." filter, from which it emerges completely sterile. In warm weather, the treatment up to passage through the "E.-K." filter must be carried out under refrigeration, to prevent fermentation from setting in. Subsequently it will be shown how CO_2 is used to obviate the need of refrigeration in this service.

Beyond the "E.-K." filter, further handling of the grape juice must be aseptic, so that no new micro-organisms can possibly enter it. This means that all containers in which the juice is stored, and all hoses, pipes and other auxiliary equipment, must be sterilized. Also the product must be filled into bottles, which are sterile—sealed by a special method which maintains sterility. And, while being handled, the juice must not be exposed to the atmosphere.

This process is difficult to carry out, as the maintenance of sterile conditions is only possible in small units. When grape juice production was first undertaken in the South African wine district in 1932, it was in a small experimental plant at Praal, operating by the method just described. As a result of its immediate commercial success, a large-capacity plant was built at Worcester, South Africa, and

(Turn to page 98)

*Abstracted from an article by Dr. F. Schmitthenner, appearing in *Wine & Spirit*, Stellenbosch, South Africa.

Raw Materials

Chemical analysis will reveal their composition but not necessarily the characteristics they will impart to finished products. For flour, the baking test indicates its production performance. But procedure followed should be chosen to reveal the quality of the flour itself rather than the skill of the baker.

By M. J. BLISH
Department of Agricultural Chemistry, University of Nebraska, Lincoln, Neb.

IN A PREVIOUS article (FOOD INDUSTRIES, June, 1935, page 283) two specific questions concerning baking characteristics of flour were raised for discussion by someone experienced in wheat selection and milling. These questions are: (1) How may good uniform baking characteristics, viewed from the angle of bake-shop production needs, be found in the wheat or imparted in milling? (2) How may uniformity be attained when naturally non-uniform raw material is used?

There is no denying that wheat, the source of flour—chief ingredient of bread—is neither constant nor uniform in its bread-making properties. Some of the differences are varietal; some are peculiarities caused by soil and climatic factors. Also commercial baking technic is not a standardized procedure.

Expediency, individual habit, local custom, and preference largely govern modern bake-shop practice. Each baker wants a flour whose properties are well suited to his individual needs, and he expects uniformity and constancy in its properties and behavior; a combination of requirements that provides opportunities, problems, and responsibilities for the cereal chemist and the production technologist.

Through individual and organized efforts, the cereal chemists are gradually improving their methods for the technological control of flour characteristics. The more important baking properties can be identified and measured by laboratory methods. These methods involve baking tests.

To appreciate fully the need for baking tests it is only necessary to realize that flour is a complex, biologically active material whose properties are essentially colloidal in character. This means that the quantitative estimation of flour constituents, alone, will not ordinarily provide the required information. While physical and mechanical methods for studying flour colloidal properties, especially gluten properties, are fully recognized as being available and constantly improved, the prevailing opinion, nevertheless, exists that actual baking tests afford the only rational basis whereby baking characteristics can be reliably evaluated. However, in the baking tests there is practically no limit to the number of variables which can be introduced. These variables include the number, variety and quantities of ingredients used; the temperature, operation time, and mechanical treatment employed; and the personal manipulative skill exercised by the operator. Intelligence, experience, and special knowledge are important factors in the interpretation of results as well as in the selection of the baking treatment.

Methods of test-baking commonly used nowadays may be classified into two main types. One is that in which the operator undertakes to bake a so-called "optimum" loaf of bread to disclose the maximum potentialities of the flour. Success in the use of this type of test depends in no small measure upon the personal experience, skill, and even the "artistry" of the baker. Obviously it is predominantly a bread-making demonstration; in no strict sense a scientific test of a material. This type of test finds greatest usefulness and popularity under conditions chosen mainly to evaluate the extent to which the flour will or will not meet certain definite and known industrial requirements. It also has its advantages for those occasions when it is customary to exhibit loaves of bread for the interest and information of salesmen, managers and others whose training and experience have not been along technical lines.

A test of the foregoing type has its distinct limitations. As ordinarily used, it is of value chiefly to those immediately concerned. It strongly lends itself to the characterization of flours in terms that reflect individual preference and customs, but fail to provide a basis for an impartial evaluation of flour properties and specifications, as such, without reference to some specific type or method of commercial baking.

THE other type of test-baking procedure is intended strictly for testing flour, impartially, for its respective properties in terms of "responses" and "tolerances" to the various treatments to which it may be subjected under present day industrial conditions. In this type of test no attempt is made to bake an "optimum" loaf. There is no special premium on individual manipulative skill and artistry. In fact, the desire is to eliminate that feature as much as possible in order that the test shall reflect the properties of the flour itself —not the skill and dexterity of the baker. This procedure is essentially a serious effort to apply a fundamental and well-known principle to flour testing; the principle that any presumably scientific test of a material should involve not more than one variable.

In spite of the number and complexity of factors—chemical, physical and biological—involved in a baking test, the foregoing principle can be advantageously applied in the identification, measurement and classification of those baking properties which cannot be reliably ascertained by chemical analysis. The so-called

Flours having the same chemical analysis properties may exhibit marked differences when baked into a "scientific" test loaf. Loaves "F" and "J" indicate an extreme difference in quality between two flours having the same gluten content but differing in "age" or "maturity." With evidence of such difference in the flours before him either the miller or the baker has better opportunity to make appropriate changes in the handling of his flour or in the ingredients and procedure of handling his doughs to have "J" as satisfactory as "F" than he would have in the absence of such a test.

"pup" test is one that undertakes to accomplish this purpose, largely through emphasis on the following features: (1) Fixed, arbitrary specifications of formula, time treatment and environmental conditions. (2) Utmost precision in the control of temperature, both as to degree and uniformity. (3) Control and mechanization, to the greatest possible degree, of all physical manipulation. (4) A quantity of flour small enough (100 gm.) to permit the utmost convenience in the control of all operations and conditions. With these conditions properly fulfilled, an individual operator of average intelligence and no extraordinary training or skill can, under the same laboratory conditions, secure reproducible results on any given sample with a negligible factor of experimental error. This, of course, is the first requirement in any scientific testing procedure.

Successful measurement of flour properties by a method of this type is, to be sure, predicated upon the assumption that the technician has a clear-cut understanding of what properties are to be measured, and why. Admittedly, the procedure is somewhat complicated by the fact that the properties, themselves, have not yet been defined in standardized and mutually understandable terms. Familiar terms such as "baking strength," "stability," "gluten quality," "fermentation tolerance," and the like are commonly used in characterizing baking properties. Inquiry among practical bakers and technologists, alike, as to precise meanings of these terms and expressions usually reveal that there is considerable confusion, uncertainty, and difference of opinion. The controversial aspects of the definitions have very likely been a major handicap to the establishment of rationally scientific and even standard methods for measurement, control, and specification of flour properties.

Experience has convinced us that the more important flour properties can be simply designated and simply classified. With such a classification in mind, and using the "scientific" method of test baking, exclusively, the properties, themselves, can then be measured and recorded without any serious difficulty.

Designation of those baking properties which rank first in industrial importance involves, fundamentally, two aspects to be considered both individually and in their mutual relationship. On the one hand are the natural or inherent properties of the wheat itself. On the other are the methods now conveniently available in industrial practice whereby properties can be altered to suit specific industrial needs. Realizing that a flour's "quality" or "strength" is customarily rated on the basis of its capacity to make a large, well-risen loaf, considerable importance and value are attributed to the ability to distinguish among loaf properties those which are inherent; those which are the result of special or artificial treatment; those which suggest need for further treatment; and those which indicate too much treatment. Herein, very largely, lies the basis for technological control in the manufacture of uniform flour and bread from a raw material that may itself be inherently lacking in uniformity.

FROM the standpoint of present day industrial requirements, particularly in America, the flour's response or tolerance towards artificial maturing agents is one property which probably outranks all others in importance, both in its influence on bread characteristics and in its susceptibility to alteration by convenient artificial methods available to both miller and baker. The chemist classifies these chemical "maturing" substances as "oxidizing" agents. Almost instantaneously they produce results comparable to those which would otherwise appear only after weeks of natural aging of the flour. The miller ordinarily applies this oxidizing treatment in the form of a small, carefully regulated quantity of a chemical gas, such as nitrogen trichloride. The baker uses it when he adds certain "yeast foods," or "bread improvers" containing potassium bromate.

When two different flours of equally high gluten content, freshly milled from sound, well-ripened wheat, not artifically matured by treatment ordinarily a standard feature of milling practice, are baked by the same procedure, using only the simple ingredients; flour, yeast, sugar, salt and water, the resulting loaves reflect inherent properties only. When, under these conditions, flour "F" produces a large, well-risen loaf, while flour "J," although of equal protein content, yields a small, poorly-risen, heavy-textured loaf, it is quite possible to conclude (as has frequently been done) that "F" has a superior "gluten quality," whereas the gluten of "J" is "weak" or inferior in quality. If, however, the same flours, after being processed by the usual "maturing" treatment, are subjected to the same baking treatment as before, it is more than likely that "J" will now produce as large, well-risen, and attractive a loaf as "F"; perhaps a better loaf than "F."

"State of oxidation" is an extremely important flour property

from several standpoints; flours can have too little or too much oxidation. Many flours in their natural, untreated condition will give optimum baking responses. Such flours require no additional oxidation; indeed, they are frequently the most suceptible to injury by over-treatment. The reverse is generally true of flours which give a poor baking response when in their natural, untreated state. The latter usually respond positively to oxidation and are comparatively less susceptible to injury by over-treatment. Because oxidizing agents are so universally used, a flour's "response" becomes very important to know. The "response" may be positive, negative, or neutral. Increasing evidence indicates that flours of equal gluten content ordinarily have the same potentiality for producing large, well-risen loaves, but that expectations are likely to be fulfilled only when each flour is adjusted to a favorable "state of oxidation." We can therefore within reason accept gluten quantity as a reliable index to flour "strength" with greater assurance than was our custom in times past; when poor baking response was more frequently attributed to a fictitious "inferiority" in gluten quality.

A BRIEF statement of the manner in which "state of oxidation," with its implications, can be satisfactorily measured and dealt with by means of scientifically performed baking tests is now in order. The flour is baked using only the simplest ingredients according to the fixed, specified, and controlled method to which reference has previously been made. This method is the so-called "basic procedure."

Knowledge of the flour's protein, or gluten content is essential because obviously more is expected from a high than from a low protein flour. If the flour is in its proper state of oxidation and provided with enough sugar to support ample gas production, its response in terms of loaf volume and other physical characteristics should correspond to the quantity of gluten that is known to be present. When suitable response fails to materialize, there are usually unmistakable symptoms which will indicate to an experienced operator whether the flour has received too much or too little oxidation. To confirm the diagnosis, however, it is necessary merely to conduct a similar test with the addition of a regulated quantity of a suitable oxidizing agent. The nature of the response will give the answer in terms which can be made quantitative as well as qualitative. This procedure is the basis of the so-called "bromate differential" test; potassium bromate is a convenient oxidizer for the purpose. However, other oxidizing substances may be used.

From the standpoint of maintenance of uniformity of flour gluten characteristics, state of oxidation is perhaps the most important single property that is subject to control by the miller.

Another important property is the flour's response or its tolerance to mechanical treatment; especially in dough mixing. Under conditions which may involve prolonged high-speed mixing, or some other form of severe mechanical treatment, certain flours "break down" more rapidly than others. On the other hand, some flours require more mechanical dough mixing than others if optimum gluten "development" or "conditioning" is to be realized.

Tolerance or response to mechanical treatment is essentially a varietal or inherent wheat characteristic. It is less easily controlled by the miller than oxidation, unless the miller knows just what varieties of wheat he is handling. This knowledge is uncertain because some varieties cannot be distinguished from each other after the wheat has been threshed and moved to the elevator or to the terminal market. Control of mixing properties must therefore be left largely to the skill and the judgment of the baker.

In experimental baking this property can be studied and measured by means of differential mixing tests. The basic procedure is employed, as before, and with it are performed duplicate tests in which only the mixing time is progressively varied. Response to this type of testing can readily be interpreted and translated in terms of industrial utility.

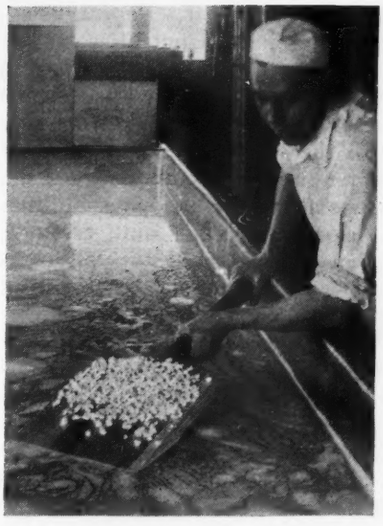
IN SO FAR as concerns the gluten properties of flour made from sound, mature wheat, untreated with malt or germinated wheat products, "oxidation tolerance" and "mixing tolerance" are the two most important considerations. At any rate, this statement holds with respect to the great majority of our well established and approved wheat varieties.

"Fermentation tolerance" is a flour property of great interest to bakers. Again confining our attention exclusively to un-malted flours, milled from sound wheat only, fermentation tolerance has now become well established as not being essentially a gluten property. Because of the almost negligible quantity of active proteolytic enzymes in sound flour, gluten is extremely resistant to the processes of normal yeast fermentation over any reasonable range of fermentation time likely to be employed in the bake-shop. Fermentation tolerance is predominantly dependent upon a properly insured gas production throughout the entire process of dough fermentation, and is therefore dependent upon the maintenance of an adequate sugar level; flours of low diastatic power must be appropriately supplemented with sugar or malt. This adjustment may be made either by the miller or baker and by methods which are familiar to all.

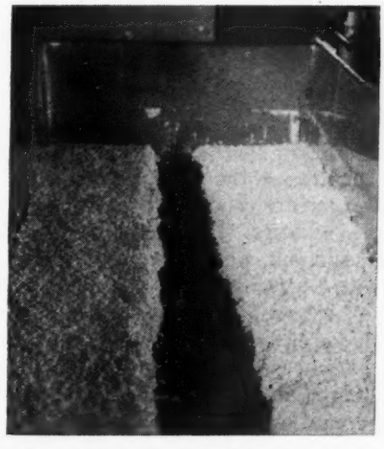
Fermentation tolerance is customarily measured in test baking merely by making two or more bakes in which the basic procedure is followed in all respects excepting the fermentation time, which is systematically varied. Relative fermentation tolerance may, however, be estimated from only one test bake, providing the test is performed under fixed conditions; rigidly controlled with special reference to degree and uniformity of bake-oven temperature. When all loaves have been exposed to precisely the same baking conditions of time and temperature, crust color is a reliable diagnostic symptom. Because crust color is the result of sugar caramelization, the depth of color should be proportional to residual sugar in the loaf. Also fermentation tolerance is, in turn, a function of maintained sugar level in the dough, hence the correlation between it and crust color as produced under controlled condition. Consequently with a little experience the operator can estimate fermentation tolerance from the depth of crust color on a test loaf baked under the "basic procedure."

The foregoing discussion of flour properties, of their estimation and interpretation by means of scientifically controlled baking tests, has of necessity been intended to apply exclusively to sound flour, milled from mature wheat only, and flour to which no malt or germinated wheat preparations have been added. Admittedly, the cereal chemist and the baker frequently have to deal with flours which do not fall strictly within this classification. Among these are to be

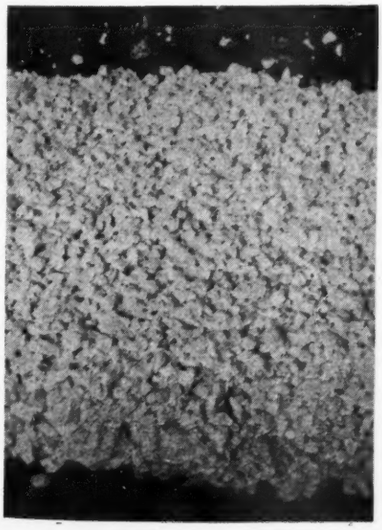
(Turn to page 104)



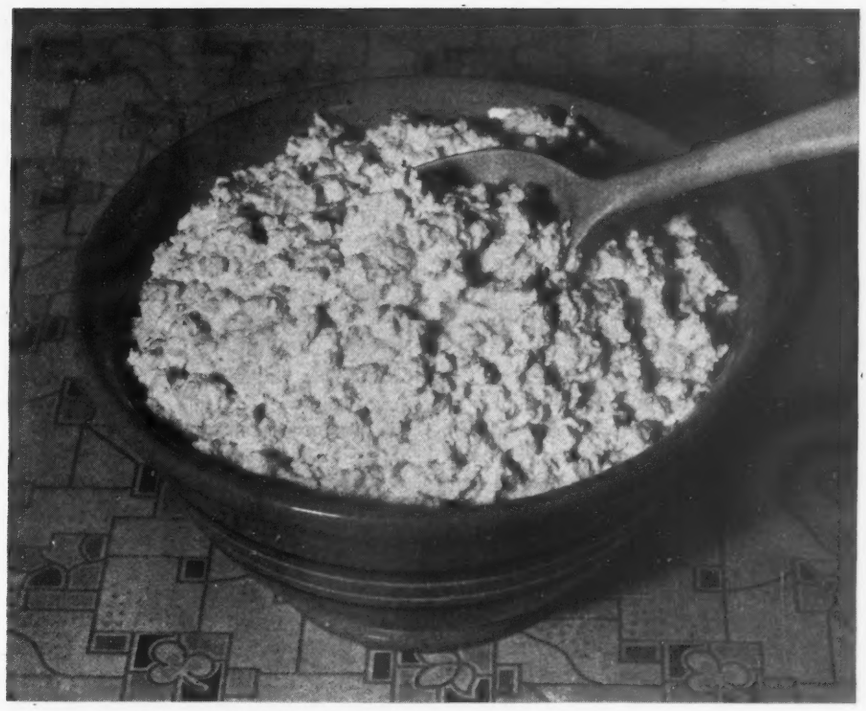
After the curd is cooked, it is thoroughly washed with cold water in order to chill the curd and remove the acid from it.



When washing is completed the water is drained from the vat, a trench being made in the curd to hasten the process.



Curd of low-acid type cottage cheese, after draining is completed. It should be chilled overnight before creaming.



When creamed, low-acid type cottage cheese is an attractive dish, appealing particularly to the palates of the younger generation.

How Low-Acid Type Cottage Cheese *Is Made*

Manufacturing method developed and commercially tested for three years provides a popular product other dairies might profitably add to their line

By R. F. FLINT
Vice-President and Manager, Grove City Creamery, Grove City, Pa.

"NO ONE would think of feeding hams and bacon to hogs to make more hams and bacon. Why then should skim milk, which contains similar nutrients and may even be superior in quality be used as an animal food? It would make a valuable addition to our supply of human foods." This statement made by B. H. Rawl, chief, Dairy Division, U.S. Department of Agriculture, during the World War when meat was being conserved for our military forces. At the present time his statement has much the same application but from a slightly different cause.

Chief Rawl further contended that while skim milk might be available in abundance in the country and at milk handling plants, it was not often available to the consumer in the cities. Therefore it should be made into cottage cheese, 100 lb. of skim milk producing 15 lb. of cottage cheese, approximately equal in protein value to 15 lb. of lean meat.

Cottage cheese, schmierkase, handkase or Dutch cheese, by whatever term designated, is the simplest, and oldest type of cheese. It is the coagulum of skim milk, therefore has the food nutrients of whole milk cheese minus the fat. And in cottage cheese, with cream added, this element is replaced to whatever degree the maker wishes, but rarely to the percentage of whole milk cheese. Cot-

tage cheese, however, high in protein content, is an economical source of supply of this essential food element.

The mention of cottage cheese as an item in the diet was usually a signal for a smile, before it was dignified through governmental activity during the War. Associated with that was the development of standardized, better methods of manufacture and the utilization of a higher grade of skim milk. Previous to that cottage cheese was mainly the salvaging of otherwise waste material.

The methods employed by milk plants are now such that a dependable grade of cottage cheese is available. While there are still slightly different methods employed by manufacturers, one method which gives a highly satisfactory product, known to the trade as low-acid type cottage cheese, follows:

TO insure a uniformly high quality of cottage cheese it is necessary to have sweet, good-flavored skim milk, also a smooth-bodied, well-flavored lactic culture, or starter. A mother culture should be set each day.

Procure from a commercial dairy laboratory a lactic culture. From the daily milk delivery of a selected producer, obtain one or more quart bottles, about two-thirds full, of milk. Low fat-content milk is preferred. Covercap the bottles and place in a sterilizer and heat to a sterilizing temperature. Hold at a sterilizing temperature for at least 30 minutes before cooling to 68 or 70 deg. F. At the time the milk is being sterilized, also sterilize the tube or pipette to be used in transferring the culture.

When ready to inoculate, draw about 6 or 7 cc. of culture into the pipette and transfer to the sterilized milk. Rotate the bottle to mix contents thoroughly. Place in incubator for about fifteen hours, to develop from 0.8 to 0.85 per cent acidity. If acidity goes too high, cut down a little on the inoculation or use a lower incubation temperature on the succeeding settings. If acidity does not develop enough, use a little larger amount of inoculation or raise the incubating temperature slightly.

To make the culture for use in the cottage cheese, run skim-milk from separator into starter can and sterilize at 180 to 190 deg. F. for at least 30 minutes before cooling to 68 to 70 deg. F. Inoculate with about ½ pint of mother culture for each 10 gal. of skim-milk in the can. Allow to ripen until it develops 0.8 to 0.85 per cent acidity, which should require about fifteen hours. It should then be stirred smooth and placed in the cooler until it is used. All cultures should be made new each day, whether used or not.

IN the manufacture of cheese, skim-milk comes from the separator into the pasteurizing vat and should be pasteurized at from 143 to 145 deg. F. for 30 minutes. Cool to 76 to 80 deg. F., depending upon the room temperature during the setting period. The milk is then conducted to a cheese vat. Inoculate with culture from starter can, using enough culture to develop from 0.65 to 0.7 per cent acidity on whey, or if test is taken of curd. It should be about .90 per cent in about fifteen hours. It usually requires from 1 to 2 per cent of culture.

When the proper acidity has developed, cut curd with ½-in. knives, lengthwise of vat with horizontal knife and both ways with vertical knife. Fill jacket of vat with water at 115 deg. F. Turn steam on slowly for first part of cooking. Care must be taken when stirring curd, until the temperature reaches about 100 deg. F. It is then firm enough to stand more severe agitation without breaking the curd particles.

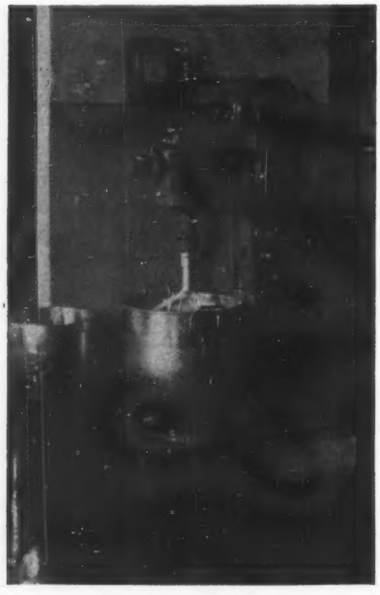
It should require from 2 to 2½ hours to cook a vat of cottage cheese to the final temperature of 118 to 120 deg. F. The whey is then drained off and cold water added to chill and wash acid from the curd. This water should be drained off. Repeat, using about the same amount of water for each washing as there was whey in the vat. After washing, trench the cheese, leaving an opening in the center of the vat for water to drain off freely. It should be allowed to drain for one hour before dipping into tubs and storing in cooler until creamed. It should be allowed to chill overnight before creaming.

CHEESE made and chilled as outlined can be creamed satisfactorily by using a Hobart 40-qt. cake mixer equipped with a "B" flat beater. A 40-qt. mixer will handle up to 90 lb. of creamed cheese, but will not efficiently mix less than 50 lb. at a batch. The procedure is to weigh the dry, chilled curd into the bowl and set the beater in motion in low speed to loosen up the curd. Add salt at the rate of 24 oz. to 100 lb. of dry curd and 15 per cent sweet cream at the rate of 40 lb. per 100 lb. of curd. Do not add all of the cream at first.

Run the mixer for about five minutes at a low speed, adding the last of the cream as the cheese absorbs it. The mixture should be quite wet after mixing. Place the creamed cheese in the cooler over night, when it will be found that the curd will have absorbed enough of the cream so that a pleasing moist cheese results. If the cheese is mixed without prechilling, there is danger of churning the cream, which is undesirable. Only by observing the texture of the curd from day to day can the operator tell how much cream will be absorbed by the curd during the first twelve hours after mixing, because of the difficulty of securing identically similar texture in the curd from day to day. If small granules are desired in the cheese, stir the dry curd at low speed, then in second gear until it is well broken up, after which it can be creamed in the usual manner or packed dry, as required. Preferably, the cheese is not creamed in advance of orders.

The above procedure provides a low-acid, palatable type of cottage cheese with a rich, creamy texture. Its sweet flavor is acceptable to the American consumer, and particularly so to the younger people, to whom a highly acid flavor is less pleasing.

An acceptable resale family unit is a 12-oz. double-paraffined carton. Freshly creamed cottage cheese packed in these cartons and held under household refrigerator conditions will retain its sweet flavor for a week.

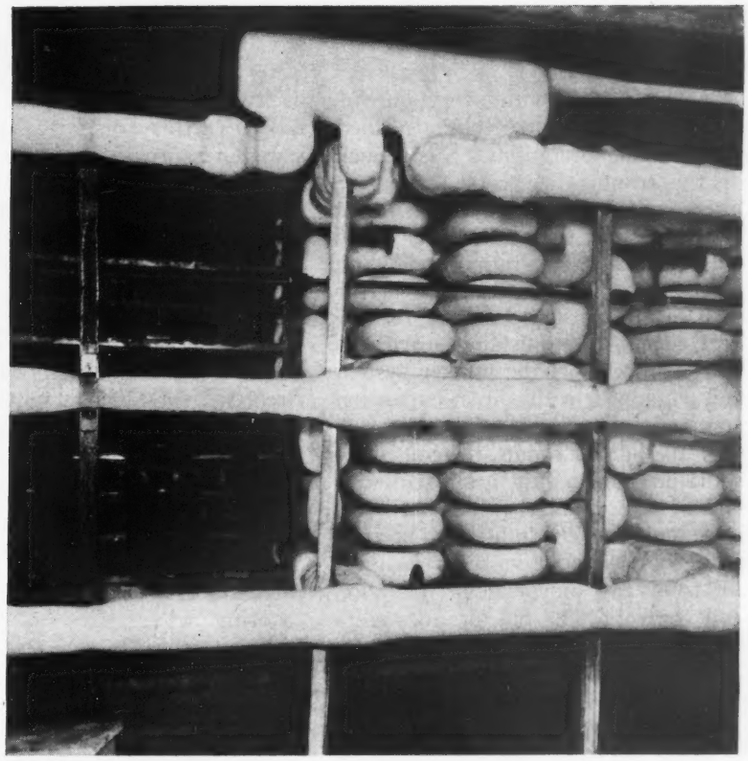


Creaming is accomplished in this Hobart electric cake mixer, using a "B" flat beater.

Rebuilt Cooling System

Boosts Production and Quality

By CHARLES A. BLATCHLEY
Consulting Engineer
Philadelphia, Pa.

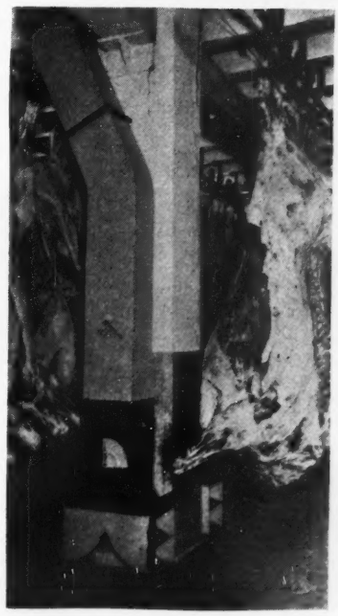


One of five bunkers of direct-expansion ammonia coils which refrigerate four pork and one beef chilling rooms. One section is cut out for defrosting.

COOLING time has been cut from 28 to eighteen hours in the hog chilling rooms of Arbogast & Bastian Co., Allentown, Pa., packer. By the same changes which brought about this great improvement, the quality, not only of fresh pork but of cured pork and fresh beef, has been substantially bettered, the cutting of hog carcasses has been speeded, defrosting of ammonia coils has been made easier and refrigeration power costs have been somewhat reduced.

All this was accomplished by replacing an old and improperly designed refrigerating system with one incorporating modern principles and particularly adapted to the needs of a meat plant. No increase was made in ice-machine capacity, the old units serving the new system.

To fully appreciate the vast improvements made, it is first necessary to have a mental picture of how conditions had been. Under the old system, four pork chilling rooms on the fourth floor, salt pickling rooms on the third and second floors and a beef cooler on the first floor were refrigerated by gravity air circulation. Cooled by passing over direct-expansion ammonia coils located in fifth-floor bunker spaces, the air passed downward into the various rooms through masonry flues extending all the way across one side of each room. Then it was carried back to the coil bunkers by similar flues located on opposite sides of the rooms.



Cold air delivered through metal ducts from bunkers of ammonia coils on the fifth floor refrigerates the beef and pork chilling rooms on the first and fourth floors, respectively.

As the production of the plant increased, the flow of air by gravity was insufficient to chill the required number of hog carcasses within the allowable time, so fans had been installed to increase the rate of refrigeration. This resulted in too rapid cooling of carcasses near the air-intake side of the room, the outer fat being frozen before the animal moisture left the meat and the carcasses being made too hard for cutting. But carcasses on the other side of the room did not become sufficiently solid for proper cutting unless left in the coolers longer than the usual time. In addition to these serious troubles, the pork-cooling rooms would fog up badly when fresh carcasses were introduced, doing some damage to the appearance of the meat. Moreover, the temperature would rise to 40 or 45 deg. F.

Nor did the fog stop in the pork rooms. It entered the flues and passed also into the pickling and beef-chilling room. In an attempt to relieve this condition and prevent discoloration of the cuts, dampers had been installed in the beef-cooler flues. These were closed while the pork rooms were being charged, resulting in temperature fluctuations and stale air in the cooler, with further deposit of moisture on the chilled beef. In the pickling rooms, the temperature fluctuated so badly that curing was not uniform, and it was difficult to determine when a cure was completed. Furthermore, the entire refrigerating system was connected to a common suction line, so that every chilling room in the plant was af-

fected by the fluctuating demands of the pork coolers.

TO DO away with every one of these undesirable conditions called for sweeping alterations. Since much of the trouble had come from the interconnection of the different rooms, each of the coolers was placed on a separate refrigeration cycle, with forced air circulation provided for each of the pork rooms and for the beef cooler. The pickling space was taken entirely off the bunker system and equipped with direct-expansion ammonia coils.

In the bunker rooms, the coils were shortened and a fan installed in one end of each bunker. Then partitions were built between bunkers to provide each cooling room with its own set of coils for independent operation and control. The old air flues were torn out, incidentally adding about 200 sq.ft. of floor space to each room. Metal ducts serving each room independently replaced the old flues.

Being the most important and most rapidly fluctuating part of the refrigerating load, the pork rooms were placed on a separate compressor. This arrangement permits the compressor to operate at higher back pressure and consequently with greater efficiency, reducing power costs. The method also permits the temperature to be regulated so that it rises as the rooms are loaded and drops as the meat cools to maintain a narrow temperature difference between the rooms and the pork and give uniform cooling of carcasses.

With this arrangement, hog carcasses are ready for cutting within eighteen hours after they enter the chilling room, compared with the 28 hours formerly required. Since the inefficiency of the old system had made a bottle-neck out of the chilling rooms, production is speeded all along the line. Another advantage accrues as greater efficiency in the cutting department, the carcasses being thoroughly and uniformly chilled.

In the pork chilling rooms, the temperature ordinarily is kept at 28 deg. F., with the air circulating rapidly. Each pork-room fan delivers 6,500 cu.ft. of air a minute, the capacity of the rooms averaging about 20,000 cu.ft. The fans operate at a static pressure of 1¼ in. forcing the cold air down through the ducts and into the coolers. With this pressure in a room, warm moisture-laden air does not rush in when a door is opened. Cold air flows out instead.

Since the humidity is not controlled in the pork rooms, and since air is circulated rapidly over the carcasses, it might appear that excessive shrinkage would occur. But that is not true. The low temperature of 28 deg. and the rapid heat-conducting action of rapidly moving air combine to chill quickly the coating of fat on the carcasses and thus form a protective covering which prevents too much moisture from being extracted. Such a system will not work with beef, however, because there is no protecting layer of fat.

THE beef-chilling room not only was provided with a separate bunker of coils, but with a water spray, or atomizer system, which maintains the relative humidity of the air in the beef room at 58 to 60 per cent. It is installed in the bunker room so that the air passes through the spray after it has been chilled by the coils. This gives a two-way action. If the air is too moist, some water is taken out by cooling, but if it is too dry, the spray increases its humidity.

The fan in the beef cooler is large, having a capacity of 20,000 cu.ft. to serve the 96,500 cu.ft. of space in the cooler; it operates at a static pressure of 1½ in. The speed of the fan, and hence the rate of refrigeration, may be controlled from the room itself.

The new system for the beef room maintains a steady temperature, from 32 to 34 deg., and a constant humidity. It prevents sweating of the meat and makes possible maintenance of high quality. An important feature is that circulation is so arranged that none of the air which has taken up moisture from carcasses will again pass over any of the meat. Provision has also been made to distribute the air uniformly over the beef at a fixed velocity not to exceed 50 ft. per minute.

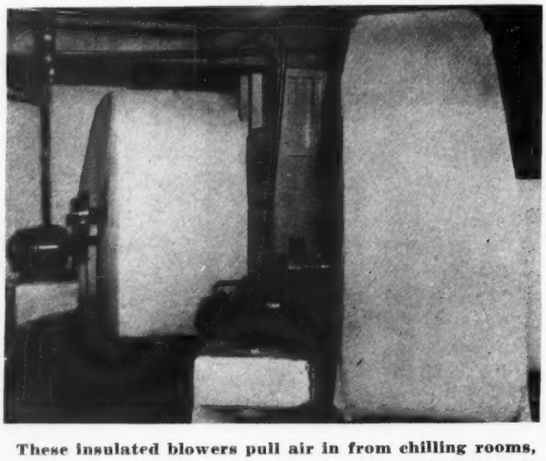
Installation of coils in the pickling rooms has made it possible to maintain a uniform temperature of 35 to 38 deg. This insures a good-quality, uniformly-finished product.

The ease with which defrosting can now be accomplished represents real value in time saved. Formerly, it had involved the tedious procedure of knocking the frost and ice off the coils. Now the ammonia is merely reversed and defrosting takes place in two hours, with no labor whatsoever. The coils are defrosted every ten days, and each bunker is built in two sections so that one may be cut out while the other carries the load.

As to the blowers used in this installation, they are non-overloading, multivane units of the Sirocco type. The pork-room fans are propelled by 3-hp. motors; that for the beef cooler by a 10-hp. unit. The speeds of all motors can be regulated to alter the rate of cooling and change the temperatures.

To give an idea of the number, size and spacing of the air ducts used, the beef cooler may be taken as an example. This cooler measures 27x75 ft. and is subdivided into three rooms. There are ten ducts delivering air into the rooms and twelve taking it out. The delivery ducts are along the center of the rooms, the inlets being near the floor. The outlets are near the ceiling at the sides of the rooms to provide a natural circulation without eddy currents. Outlets and inlets are alternately spaced to facilitate circulation, and each duct has a cross-sectional area of 1,500 sq.in.

The new system which has effected so many improvements for Arbogast & Bastian Co. was installed a section at a time without impeding operations in the plant. It cost approximately $30,000.



These insulated blowers pull air in from chilling rooms, pass it over bunkers of ammonia coils and deliver it back to the coolers under slight pressure.

Pre-Cooling Halts Decay

Improvements in packing celery in Florida for distant shipment suggest methods suitable for use in preparation of other food products

By W. A. LEFFLER
Chase & Co., Sanford, Fla.

Top: Plant of Chase & Co., Sanford, Fla., in the heart of the winter celery growing district. Below: Inspecting celery out of field boxes onto conveyor.

FRESH celery handling has undergone many changes and improvements in recent years. For a long time this vegetable was harvested and packed on the ground in the field. It was then hauled directly to the cars for shipment.

The cars were standard refrigerator cars and the method of refrigerating then employed was the standard one of ice bunkers, the celery being loaded without precooling. Cars moved to their destination under what is known as "standard refrigeration"; that is, the cars were iced at every regular icing station.

With these methods, there was considerable wilt and the celery had a ragged appearance. The refrigeration in the car was not sufficient to remove the heat from the celery in time to arrest decay. The tops often became yellow, particularly in the upper parts of the car where the air was warmer and the refrigerations was not so effective.

Later, while the same method of packing was continued, top-icing of the cars was adopted to overcome some of the troubles. Under this method finely cracked ice was thrown all over the load after it was put in the car. This practice served to reduce the temperature of the celery very quickly and was a great improvement. Depending upon weather

conditions at the time the shipment moved, we used "standard refrigeration" in addition to the top-icing. Sometimes only the initial bunker icing was used along with the top icing. In very cool weather, top-icing alone was used. In this way refrigeration costs were reduced.

Still later, the practice was adopted of packing the celery in packing houses where, after packing it was chilled by spraying with refrigerated water. This proved only partly effective.

From these methods was developed our present system of celery packing, found to be very effective. Under this plan, the harvested celery is placed in field boxes and transported to the packing house.

Celery from the field boxes is placed on a woven wire inspection belt 4 ft. wide. As it is removed from the boxes, it is inspected for blemishes, and any discoloration in the leaves or defect in the stem is removed, or the stalk is thrown out if that is necessary.

Still moving on this wire belt, the selected celery, covering the entire width of the belt, goes through a bath of water. This water is stirred, and thrown up and over the celery from the top and bottom by propellers. The water thus passes through and over the chain, washing loose any sand or dirt that adhered to the celery. During the washing, which is in action something like a clothes washing machine, no moving parts of the machine come into contact with the celery, thus avoiding damage.

AFTER this first washing, the celery, still on the belt, passes under a spray of fresh, clean water under a pressure of 15 lb. per sq.in. This spray runs back into the tank where it forms the make-up water for the first washing. The tank has an overflow, where waste and sand is collected in traps, which are frequently opened, emptied and cleansed.

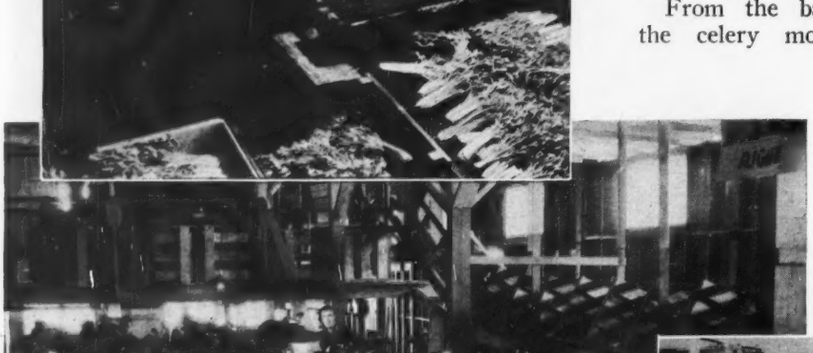
For this washing process, and the clean water spray which follows it, the water comes directly from the plant's artesian wells. Its temperature averages 70 deg. F.

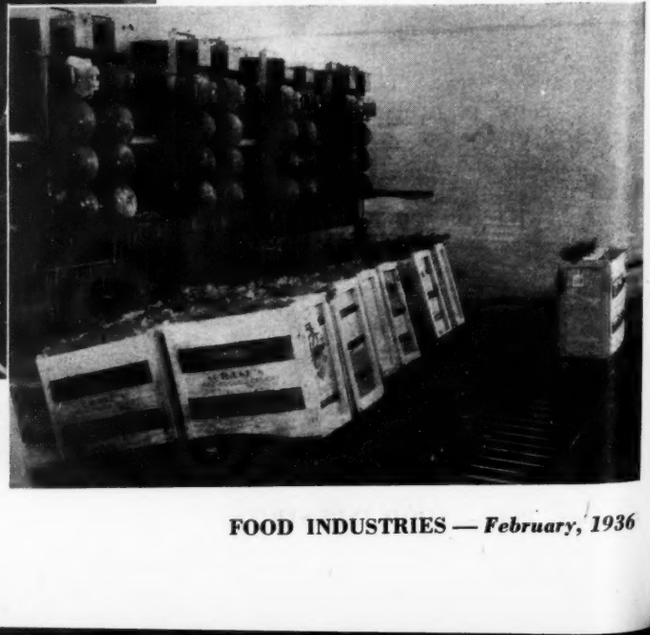
From the bath, the celery moves along on the belt for a distance of about 100 ft., during which time it is allowed to drain. Packers and sorters, working on either side of the belt, make a final selection of the stalks, and they are then packed. As the celery is packed, the filled crates are placed on conveyors which parallel the main conveyor on each side. Crates move along this conveyor to the lidding machine, from which they immediately move to the pre-cooler.

The pre-cooler is a tank equipped with conveyors across its whole area. The conveyors move through the tank continuously at slow speed, so that the celery remains in the tank about 30 minutes. Baudelot coils are located over this tank, and water from the bottom of the tank is continously pumped over these coils, showering down over the crated celery at a temperature of approximately 33 deg. F. This precools the celery quickly and thoroughly.

Immediately upon leaving the tank the celery is conveyed into refrigerated cars for shipment or into a refrigerated storeroom to await loading. Between 5,000 and 6,000 crates, or around fifteen carloads, of celery are handled this way in our plant during every working day.

THE results of this method of celery preparation are highly satisfactory. Decay has been almost entirely eliminated. The cost of refrigeration has been reduced. It is now possible, when weather conditions are favorable, to move celery in tightly closed refrigerator cars with no other refrigeration than that due to the precooling of the product which enters the cars at a temperature of about 34 deg. F.





Top: Exit of celery washing station, showing washing tank at rear, with pressure rinsing spray in foreground. Above: Packing washed celery. Right: Packed celery crates leaving the pre-cooling tank.

"But My Business Is Different"

Yet it has many things in common with that of other food plants

DID you ever suggest to your baker friend, Jones, that the clever way in which Dairyman Smith uses conveyors might have some pointers for him? If you did, the chances are nine out of ten that that he came back at you with, "But my business is different."

Well, it is different. Jones is right. But it is also similar, and that is what so many Joneses often overlook.

At one time or another, nearly all of us have taken refuge behind that old saying, "You can't compare cabbages with chocolate," when we have been asked to make a comparison of seemingly impossible things. Yet notwithstanding that hoary maxim, it is possible to do that very thing—compare cabbages with chocolate.

It all depends on how you do it. If the problem is referred to a lawyer, he will probably say that it cannot be done. Yet if a chemist were called upon to make the comparison, he would do it without very much trouble other than to make or look up the necessary chemical analyses. After his labors were completed he would turn in a report showing in parallel columns the percentage composition of cabbages and chocolate, and they would be shown to have many things in common. And, if he were imbued with the zeal of a boy scout, and devoid of all sense of humor, he might become so engrossed in endless comparisons that he might even forget that there were some very important differences of utility between cabbages and chocolate.

All this leads to that very common saying among men in industry—"but my business is different." That point of view is probably more prevalent in the food manufacturing industries than in any other business that exists. Of course, every branch of the food business is different—just as different in usefulness or goods produced as cabbage is from chocolate! Yet from the point of view of HOW various kinds of foods are produced, there are many more points of similarity than of dissimilarity.

Could there be any greater difference than exists between a plant making salted peanuts and a corn canning plant? Take just one method that each plant employs; the mechanical husking of corn and the blanching (skinning) of the peanuts. Examine the operations as carried out in each kind of plant and it will be found to be an identical method, performed by machines that operate on exactly the same principles. Each machine must necessarily be adapted to the size of objects whose outer covering is to be removed, but there is no other essential difference.

TAKE a production manager from a macaroni factory and place him in charge of a plant making ice cream cones. Does he leave his brains behind him, just because the cone business is different? Not that anybody could notice. He finds that a great many of the things that are done in the cone plant are done almost exactly as they were in the macaroni plant. In many cases he will be able to show the help in the cone plant how to do things better than they ever knew how before. On the other hand, he will learn a few tricks himself.

There is the matter of flour storage, getting flour out of storage, dumping it in a sifter, weighing out batches, weighing water and other ingredients, mixing, moving the dough or batter to the machines. At this point a lot of differences show up, such as hydraulic pressing and drying vs. baking in cone machines. Then the operations become similar again and he will find material handling, packaging, packing into cartons or shipping containers and storing.

When a macaroni man goes to the ice cream cone plant the only things he finds that are new to him are such operations as continuous automatic baking, fuel gas mixing, and a special way of cleaning up the batter reservoirs on the cone baking machines every day. Conversely, if an experienced ice cream cone production manager goes to a macaroni plant, the only really new things to be found there would be kneading, pressing, drying, sawing.

Naturally, each will find a host of old things done in new ways. For example, the macaroni man is accustomed to move his unpackaged materials on a push truck, but when he gets to the cone plant he will find that conveyor belts are better adapted for materials handling, and some day he may go back to his old plant and put in a few belts for handling macaroni.

All manufacturing is nothing more than a series of operations. If a man knew and understood all about every possible kind of operation, he would be able to run any kind of plant successfully. He would not be called a baker unless he were running a bake shop, because a little later he might be running a pickle factory, or he might ultimately be in charge of a coffee plant. When a production man has mastered the fundamentals of each step of manufacturing operations, he will be more than merely a superintendent or production manager of some sort of a food business, he will be a well-rounded food engineer.

IN STUDYING any kind of food business that happens to be unlike one's own busienss, it is important to

break it down in one's mind into various operating units. Then, unit by unit, each step can be compared with the methods that are utilized in the business with which one is most familiar. To illustrate this approach, the following actual incident is related.

A production manager of an ice cream plant was recently considering some changes in his hardening room (the room where the final hardening of the ice cream takes place). He felt that there was need for a greater movement of the cold air and for better temperature control, because a faster rate of hardening would reduce his operating costs. About this time he read in FOOD INDUSTRIES an account of the way in which temperatures are controlled automatically in continuous baking ovens in bread bakeries. He decided that he wanted that kind of control; and, because he was one of those very fortunate persons who naturally think in terms of principles, he did not balk at the thought that his business was different. He was not like the man in the definition of the pessimist, who could see only the hole in the doughnut.

He saw the similarities—not the differences. The fact that he wanted to control air temperatures at —16 deg. F. instead of at 400 deg. F., did not bother him in the least. He saw clearly that he had a problem of temperature control of air. After visiting a large bakery in his city, he found out exactly how they controlled the temperature in their ovens, in much more detail than it was given in the article in FOOD INDUSTRIES. He then arranged the temperature control in his hardening tunnel in a manner almost exactly the equivalent of that utilized in the continuous traveling oven in the bakery—and the hardening tunnel has worked well ever since.

Space will not permit recounting here more instances of the right way to study and compare manufacturing plants and the way to utilize the other fellow's knowledge even when he is producing a product that is wholly different. However, if one will analyze any factory's procedure he will discover that most of the things that are done are mechanical operations. He will also discover some are quite different from mechanical operations. These involve a transformation of matter in the chemical sense. In order to distinguish such transformations of matter from "unit operations," they are called "unit processes." Mixing of flour and water is a unit operation because it is wholly mechanical. Cooking the mixture so that the starch flows and the gluten sets is a unit process. On the other hand, boiling the water from milk in a vacuum pan is a unit operation, evaporating, because there is involved no transformation of matter.

IN DECIDING what is or is not a unit operation or unit process, it is necessary to rule out any mention of unintentional occurrences. One could be involved in some very ridiculous arguments if this were not done. For instance, consider materials handling. One way to handle materials is to let them flow by gravity like grain or cuts of meat down a chute. When they are moving in accordance with the force of gravity, following a prearranged plan, it is materials handling. But if the material falls to the ground as the result of an accident, one would not call it intentional, nor would it be a unit operation.

A parallel form of reasoning is to be found in the case of unit processes. In the manufacture of vinegar, one of the unit processes is fermenting, which accomplishes an intentional transformation of sugar to alcohol, and another change converts alcohol to acetic acid. The production of an acid by this intentional method is strictly a unit process. But if a batch of cut corn or cake batter goes sour simply because it is allowed to spoil, it could hardly be classified as a unit process.

The following definitions are proposed by FOOD INDUSTRIES:

A unit process is an intentional or controllable change of phase or composition of a food material or ingredient.

The phrase "change of phase" is included in order to bring such steps as crystallization and freezing into the process group rather than the operation group.

A unit operation is the method by which an intentional or controllable change of form or place of a food material or ingredient is effected.

Surveying the whole range of methods employed in food manufacturing, one discovers a very large number of these unit operations, so many in fact, that it may seem at first impossible to find many that are used in common by several industries. Closer examination shows, however, that many of the terms used are interchangeable; that, for instance, what is called grinding in one industry is called crushing in another, and pulverizing in a third.

A further elimination of many of the terms used to designate unit operations is obtained if those which are essentially similar are grouped under the name usually applied to the operation by engineers and equipment designers. Thus, grinding, crushing and pulverizing are all variations of the general operation called disintegrating.

A study of the unit operations occurring in food plants in this way develops the following list of fifteen major unit operations which are here given alphabetically, without regard to their relative importance:

1. Cleaning
2. Coating
3. Controlling
4. Cooling
5. Decorating
6. Disintegrating
7. Drying
8. Evaporating
9. Forming
10. Materials handling
11. Mixing
12. Packaging
13. Pumping
14. Separating or concentrating
15. Storing

Each of these major operation designations stands for many unit operations, as has already been pointed out. While there are so many such subdesignations that the gathering of a complete list is unlikely of accomplishment, FOOD INDUSTRIES has included many in the accompanying tabulation, which will serve to indicate clearly what type of operations are grouped together.

Every food plant utilizes two or more of these unit operations. Experience in one plant cannot always be directly used by other plants, although often it is most useful. When experience can be interchanged, profit and progress result. It is on this basis of exchange of information between plants that FOOD INDUSTRIES plans a series of studies of unit operations, to be published from time to time during the next two or three years.

A word of warning is desirable here. Quite a number of men may be disappointed to discover that the list of unit operations given makes no mention of bottling, canning, dairying, fishing, meat packing. Such names refer to industries, not to operations. There is a canning industry, but any of the following—filling, exhausting, double seaming, sterilizing, if taken singly, could not properly be called canning.

Unit processes will be discussed and identified in a subsequent number of FOOD INDUSTRIES.

Some of the Most Important Unit Operations Used in the Food Industries

1. Cleaning
- a) screening
- b) sifting
- c) washing

2. Coating
- a) dipping
- b) enrobing
- c) glazing
- d) icing
- e) panning

3. Controlling
- a) Air conditioning
- b) humidity controlling
- c) inspecting
- d) level controlling
- e) measuring
- f) pressure controlling
- g) tempering
- h) temperature controlling
- i) weighing

4. Cooling
- a) chilling
- b) freezing
- c) hardening
- d) refrigerating

5. Decorating
- a) embossing
- b) imprinting
- c) sanding
- d) sugaring
- e) topping

6. Disintegrating
- a) breaking
- b) chipping
- c) chopping
- d) crushing
- e) cutting
- f) grinding
- g) milling
- h) macerating
- i) pulverizing

Disintegrating—(Continued)
- j) refining
  - by conge
  - by roll
  - by melangeur
- k) shredding
- l) spraying

7. Drying
- a) atmospheric drying
- b) heat drying
- c) air or spray drying
- d) mechanical drying
- e) vacuum drying

8. Evaporating
- a) atmospheric evaporating
- b) pressure evaporating
- c) vacuum evaporating

9. Forming
- a) casting
- b) extruding
- c) flaking
- d) molding
- e) rolling
- f) sawing
- g) shaping
- h) slicing
- i) splitting
- j) stamping or die casting

10. Materials Handling
- a) conveying
- b) factory trucking
- c) shipping
- d) trucking

11. Mixing
- a) agitating
- b) beating
- c) blending
- d) diffusing
- e) dispersing
- f) emulsifying
- g) homogenizing
- h) kneading
- i) stirring

Mixing—(Continued)
- j) whipping
- k) working

12. Packaging
- a) capping
- b) closing
- c) double seaming
- d) filling
- e) labeling
- f) packing
- g) wrapping

13. Pumping
- a) compressing
- b) gas handling
- c) liquid handling
- d) liquid pumping
- e) semi-solids pumping

14. Separating
- a) centrifuging
- b) draining
- c) evacuating
- d) exhausting
- e) filtering
- f) freezing for concentration
- g) percolating
- h) pitting
- i) pressing
- j) riffling
- k) riddling
- l) screening
- m) sedimenting
- n) sifting
- o) skinning
- p) sorting
- q) tabling
- r) trimming
- s) vacuumizing

15. Storing
- a) piling
- b) stacking
- c) warehousing

Solving Package Wrapping Problems

How to control the movement of filled packages on transfer belts designed to feed wrapping machines

By FRANK H. MAYOH

Design Engineer, Springfield, Mass.

PACKAGE wrapping machinery, designed for one job, sometimes must be changed over to accommodate a different size or shape of package from that originally contemplated. To accomplish this, the arrangements for feeding packages must be changed to accommodate the new package. It is not always apparent how this should best be done, and, with this in mind, a number of sketches of various feed belt arrangements are given here. These show how some problems of this nature have been solved in practice, and suggest solutions for other problems.

A general set-up for a package feed belt, with its control guides, is shown in Fig. 1. This arrangement includes a cross-feed plunger, and a belt-tightening unit. In the drawing, three packages are indicated at *A*. These have moved along the belt *(B)*, in the direction of the arrow *(C)*, until the first package has reached the backstop *(D)*. It is customary to have the belt almost full of packages from *D* to the outer end pulley *(E)*. Supporting the loaded belt from beneath is a supporting board *(F)*.

The belt tightener consists of a supporting bracket *(G)*, on which are hinged a pair of levers *(H)* that pivot on a short shaft *(J)*. The hinged screw *(K)* is provided with two nuts, one on each side of the levers *(H)*. By adjusting these nuts, the position of the end-pulley *(E)* can be changed.

The packages, as fed, move between the metal guides *(L* and *M)*. Note that *M* is shorter than *L*, by the distance *N*, at the outer pulley end of the guides. This is to permit the operator to slide packages onto the belt from the short guide side, until their ends lie evenly along the guide *L*, so that they will readily enter the machine.

As a package reaches the backstop *(D)*, it is fed at right angles off the belt and into the wrapping machine. This is accomplished by means of the pusher-rod *(P)*, which carries a pad *(Q)* on the end that comes into contact with the package. By means of this pusher-rod and pad, the package is propelled between the guides *(R)* against a sheet of paper or other wrapping material indicated at *S*, this wrapper being placed around the package and sealed, as it continues on through the machine.

Fixed to the pusher pad *(Q)* there is an L-shaped piece of sheet metal *(T)*. This serves to hold back the line of packages while the end package is being pushed across the line to travel into the wrapping machine.

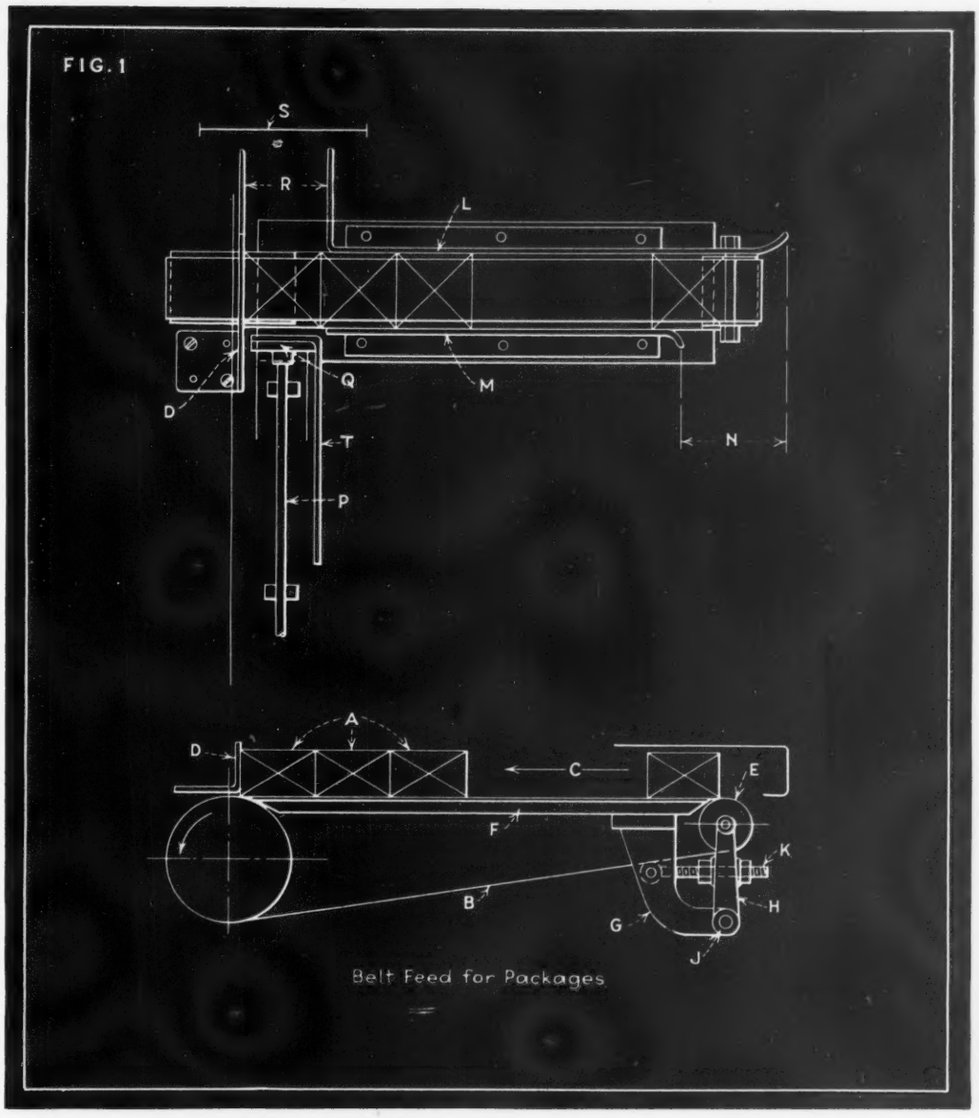
A UNIT OPERATION OF FOOD ENGINEERING

Packaging

▸All food manufacturing plants, whatever the product, have some packaging problems, and it would take many volumes fully to discuss packaging. And no single food engineer would find interest in everything that such a set of books might contain. For a usable treatment of packaging problems, it is necessary to break the unit operation down into single steps and consider each such step separately. In the accompanying article, Mr. Mayoh discusses one of these steps in a manner that will suggest to many plant operators methods that will solve some of their packaging difficulties.—Editor.

In most machines, the belt movement is so timed that the packages slip on the belt slightly. However, where the product is of a delicate nature, it is sometimes necessary to time the feeding belt so that no slippage occurs. Usually, this means putting the packages between spaced lugs, or in trays.

With this general description of the construction and operation of a feed belt in mind, applying for the usual run of packages, let us consider some of the special arrangements that have proved useful in overcoming various troubles caused by irregularities in packages or failure of the attendant to feed the packages into the machine at a regular rate.



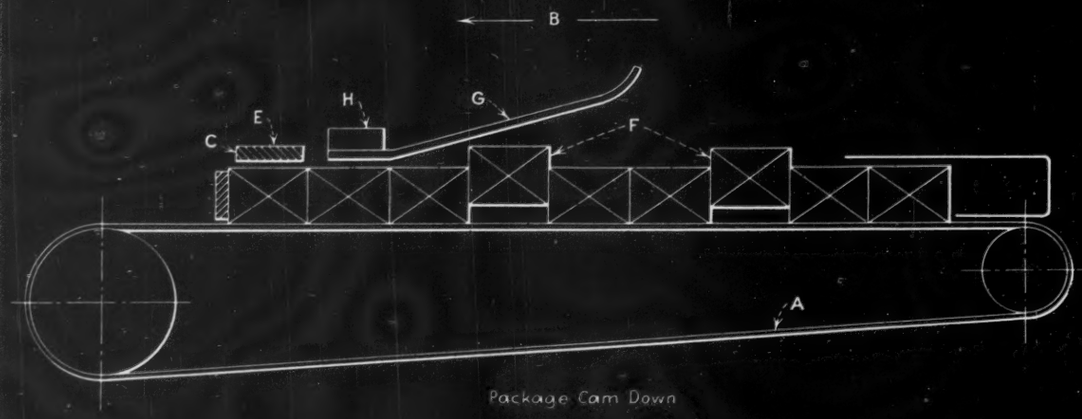
Referring to the upper sketch in Fig. 2, the feed belt *(A)* carries packages in the direction of the arrow *(B)* until the lead package comes against the backstop *(C)*. Here it is picked off by the cross-feeding mechanism. The metal plate *(E)* is added, and the packages must pass under this plate in order to register properly with the end folding mechanism. Note that, at *F*, two packages are shown misplaced, and protruding above the others. This might be caused by the operator picking up a number of packages and placing them on the belt as one unit. Were these packages allowed to continue along the belt, they would jam against the plate *(E)* when the lead package is pushed across the belt into the machine. To overcome this difficulty, a top guide bar *(G)*, supported from the side guides by a cross-member *(H)*, is installed. This is called a "flat cam," and serves to push raised packages down into place as they move along the belt. By this simple expedient, the operator is relieved from the necessity for close attention to possible raised packages, and jams and consequent broken packages avoided.

IN machines where several packages are wrapped in one bundle trouble often arises from the interlocking of packages as they are fed along the belt. The left center sketch indicates this difficulty. In this sketch, at *J*, several packages are shown being fed by the belt *(K)* in the direction of the arrow *(L)*. As these packages, three deep, feed along the belt, they should be one directly above the other, as shown at *M*, when they reach the backstop *(N)*. In this type of machine, a plunger *(P)* lifts the three end packages vertically, into a sheet of the wrapping material, as shown at *R*, while the guide *(S)* attached to the plunger pad holds back the remainder of the line of packages. If all the packages are lined up vertically, no trouble need be expected. However, as shown at *J*, the package layers tend to get out of line, as indicated by the distance *T*. If this is the case, when the plunger rises and tries to lift three packages out of the line, the tendency is to tip over the top package of the next group of three, with the result of jamming the machine.

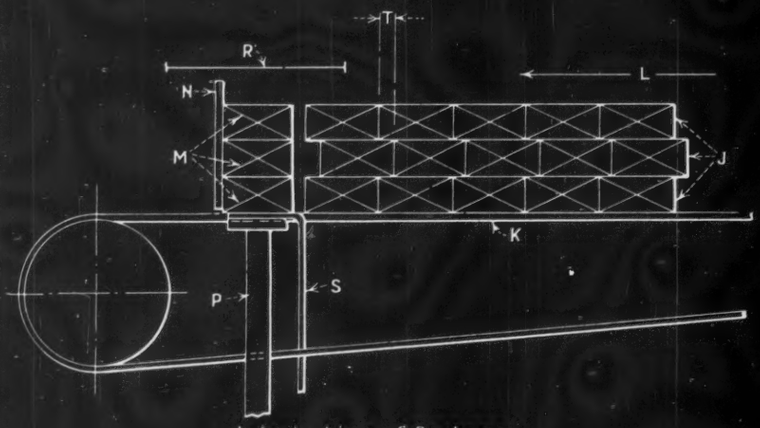
A method of overcoming this difficulty is shown in the center right-hand sketch in Fig. 2. The backstop *(V)* is here constructed with a slanted face, so that the lower layer of packages is carried farther forward than the row above it, and that row is carried farther forward than the top row. Then, as the plunger rises, the packages are forced backward by the sloping backstop until all are in the correct vertical alignment.

The lower left-hand sketch in Fig.

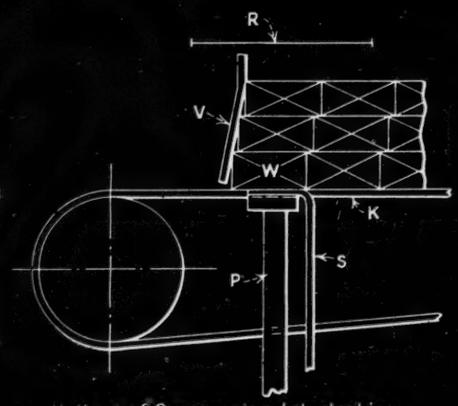
FIG. 2



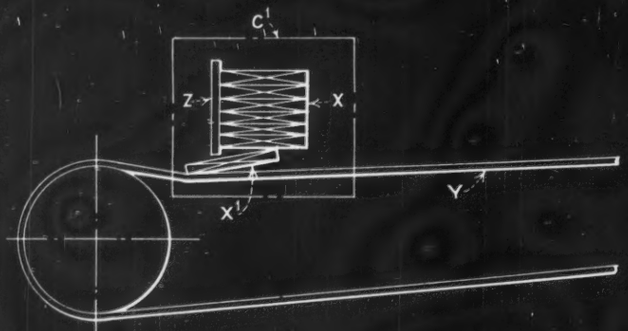
Package Cam Down



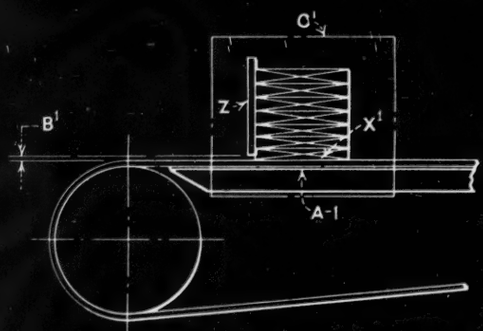
Interlocking of Packages



Method of Overcoming Interlocking



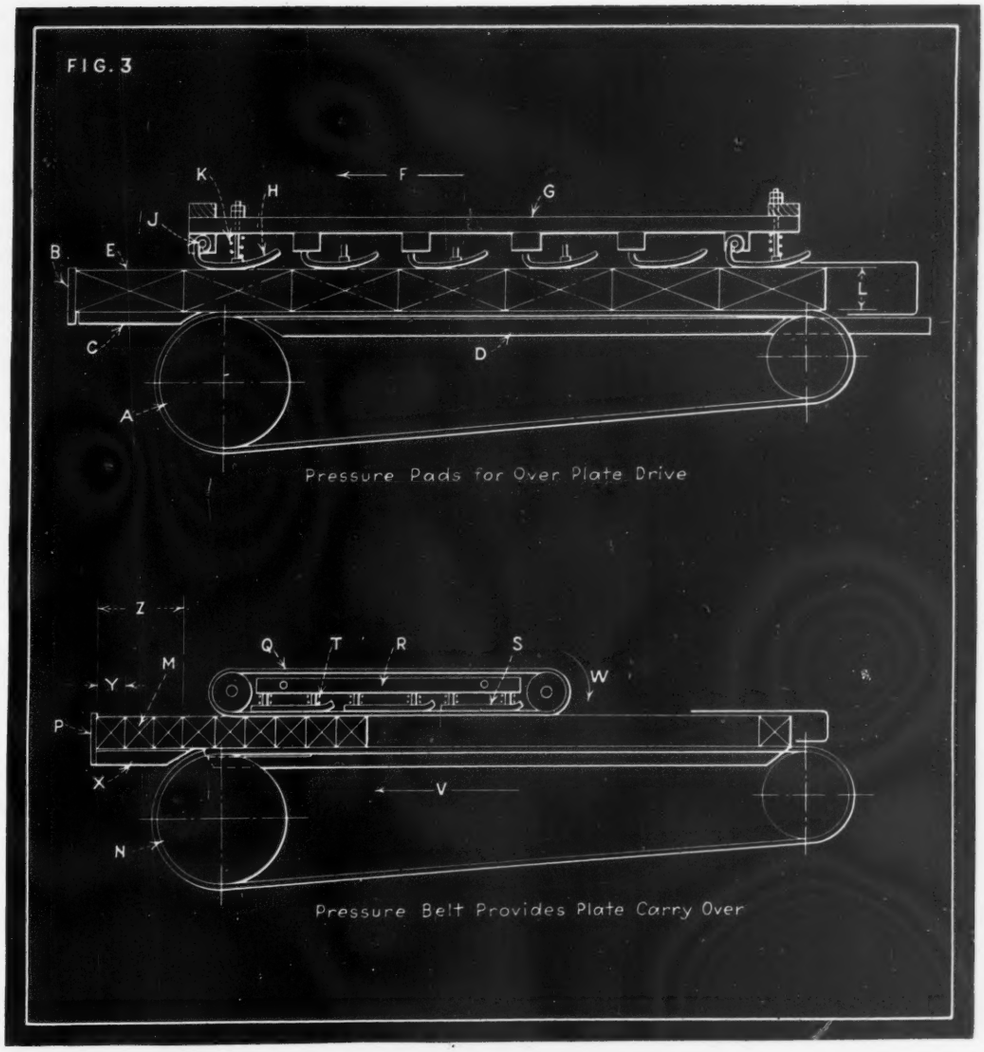
A Package Jam Due to Loose Belt



Correcting the Condition Shown at the Left

2 shows the handling of wafers, or of groups of relatively thin packages, on feed belts. This presents a problem of a different nature. Suppose seven of these thin articles, shown at *X*, travel along a belt *(Y)* with the intention that they shall stop against the backstop *(Z)*. However, the belt is unsupported at this point, which may allow the lower package to get under the backstop, as shown at X^1.

A solution for this difficulty is shown in the lower right-hand sketch in Fig. 2. Here a board (A^1) having a metal plate at the top supports the belt and holds is up close to the backstop, so that the package (X^1) cannot get through the space indicated at B^1. It is not always easy to accomplish this, because of the construction of various wrapping machines. Consequently, it is often necessary to use rolls in place of the board (A^1) to hold the belt in position.



In this construction, the wrapping material is indicated at C^1 and the articles being wrapped are fed endwise into the machine. Many belt feed machine units regularly have a plate placed beneath the feeding belt, as was indicated in the discussion of Fig. 1. But it is only in special cases that the plate is close enough to the belt to prevent thin packages from working under the backstop, particularly if the belt is allowed to become slack.

IN Fig. 1 and Fig. 2, the large belt-driving pulley has been shown at the extreme left of the sketches, so that the packages are positively moved by the belt directly into place in the machine against the backstop. In many types of machines this construction cannot be used, as it is not possible to run the belt through the wrapping machine. The belt then stops to the right of the backstop, as shown in Fig. 3, where the drive pulley is indicated at *A* and the backstop at *B*, in the upper sketch. Consequently, the packages must be pushed over the bottom plate *(C)*. This, in turn, necessitates sufficient weight or drive in the line of packages to carry the end packages over the plate and into the cross-feeding position. Therefore, unless the packages are heavy enough to provide the necessary driving force in themselves, some additional device must be provided to accomplish this.

In the sketch at the top of Fig. 3, the belt is supported from beneath by a plate *(D)*, often made of hard-wood with a sheet metal top. The packages *(E)* are shown with diagonal lines through them and they move as indicated by the arrow *(F)*. Supported from the side is a bar *(G)* carrying a series of package "hold-downs" *(H)* which are pivoted as at *J*, and equipped with springs *(K)* to provide the necessary pressure on the tops of the packages. These "hold-downs" will adjust themselves to variations in the package height *(L)* and provide the necessary tension so that the packages will not slip on the belt until the package *(E)* is against the backstop, there to be picked off by a cross-feeding mechanism similar to those already described.

When the packages being handled are narrow, as indicated at *M*, in the lower sketch of Fig. 3, it is not always possible to have "hold-downs" for each package, as described in the previous paragraph. The construction shown in this lower sketch of Fig. 3 can then be used. Here, in addition to the feeding belt *(N)*, an additional belt *(Q)* is placed above the packages, supported from the side guides of the feed belt. Also supported from the sides is a bar *(R)* which carries three plates *(S)* held down against the upper surface of the lower run of the belt *(Q)*, which is, in turn, held down

against the packages. These plates are held down by means of springs operating over pins *(T)*. Direction of travel of the main belt *(N)* is indicated by the arrow *(V)*, while *W* shows the travel of the small belt *(Q)*.

This auxiliary belt arrangement provides the necessary pressure to that a sufficient number of packages will be held down tightly against the feed belt to act as a driving means that will force the narrow packages over the plate *(X)* and into the wrapping line of the machine. The cross-feeding mechanism can then be arranged to pick off one package *(Y)* if a single package is to be wrapped; or three packages *(Z)* if the packages are to be wrapped in groups.

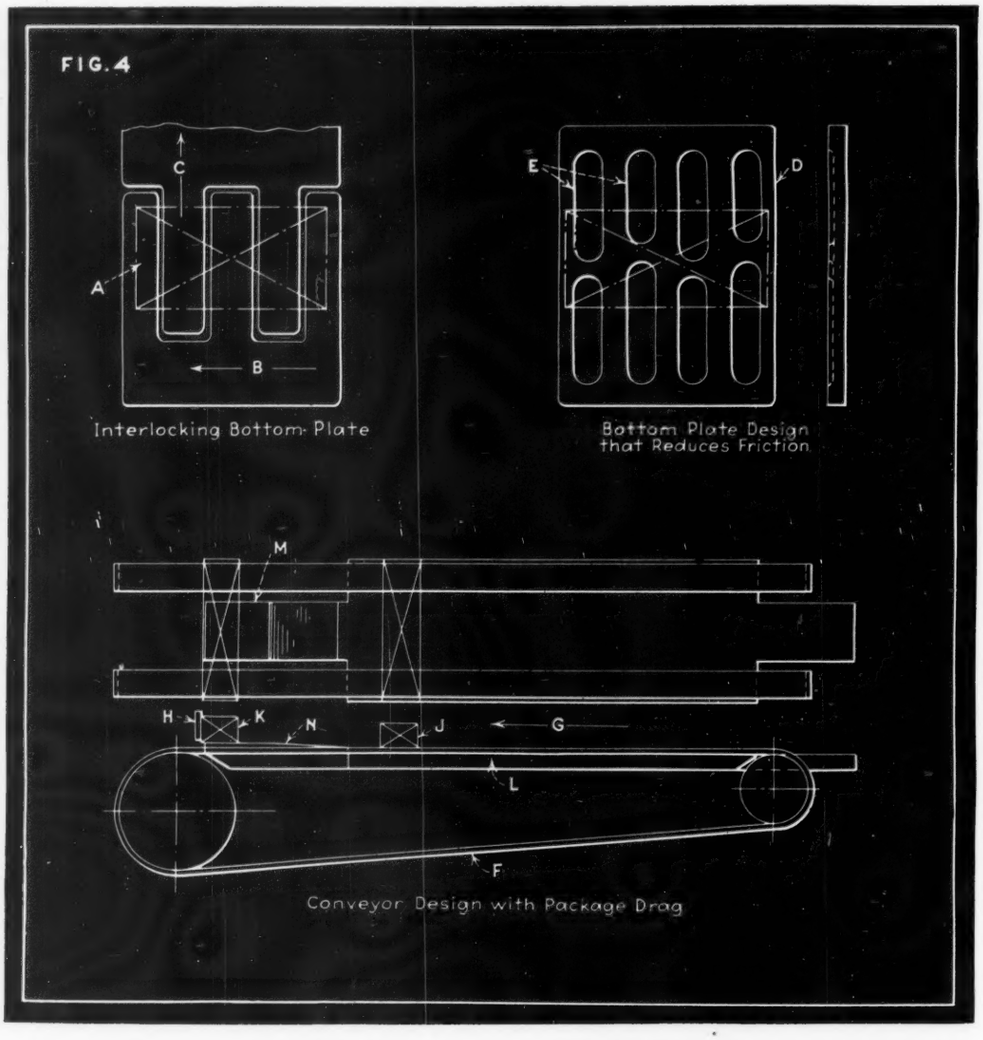
IT HAS been found that, in pushing packages over plates in two directions, it is sometimes advisable to have the bottom or transfer plate constructed in the interlocking manner shown in Fig. 4, top, left. Then, when the package, as shown at *A*, slides over the plate, first in direction *B*, and then in direction *C*, it will pass over what is, in effect, an unbroken surface with no unmatched edges upon which it can catch. This is particularly useful in cases where the package has a rough bottom. The sketch in question is a plan view of a plate that might be used at *C* in Fig. 3.

Another construction that is useful at times is shown in the sketch in the upper right of Fig. 4. Here the bottom plate *(D)*, two views of which are shown, has a surface provided with shallow indentations, or slots, indicated by *E*. These are provided to reduce the friction between the packages and the transfer plate when comparatively large, heavy packages are handled. The packages then slide over the plate more readily. In both the plate constructions illustrated, as well as in others not shown, all sharp edges should be rounded to prevent the package from scraping as it slides over them.

THE two views of a feed belt shown in the lower sketch of Fig. 4 illustrated a construction that is for use with the feed belt shown in Fig. 1. With the driving belt *(F)* carrying a line of packages forward in the direction of the arrow *(G)* until the lead package reaches the backstop *(H)*, it is sometimes found that the line of packages on the belt exerts too much pressure on the lead package *(K)*. Sometimes the sides of this package are crushed in by the pressure. It is at times possible to overcome this difficulty by having the bottom supporting plate *(L)* made with a raised sloping surface *(N)* in the central portion *(M)*. This lifts some of the packages off the belt slightly, so that fewer packages are pressing against the lead package *(K)*, and the crushing pressure is better distributed over the entire line.

It will be apparent from the foregoing descriptions of belt feeds that it is important, at the very start, to have a good idea of how the package will act as it moves into the machine. Light-weight goods will be lively and will tend to become misplaced in the line. The more expensive the goods being wrapped, the more important it is to avoid a package jam at any transfer points, as this might result in damaged goods. Sometimes open packages must be handled, often with goods protruding from the tops. Such packages present special problems, most of which can be solved through the use of various special constructions or attachments. In general, if there is unnecessary damage on a wrapping machine, it will pay to consider some refinement in design.

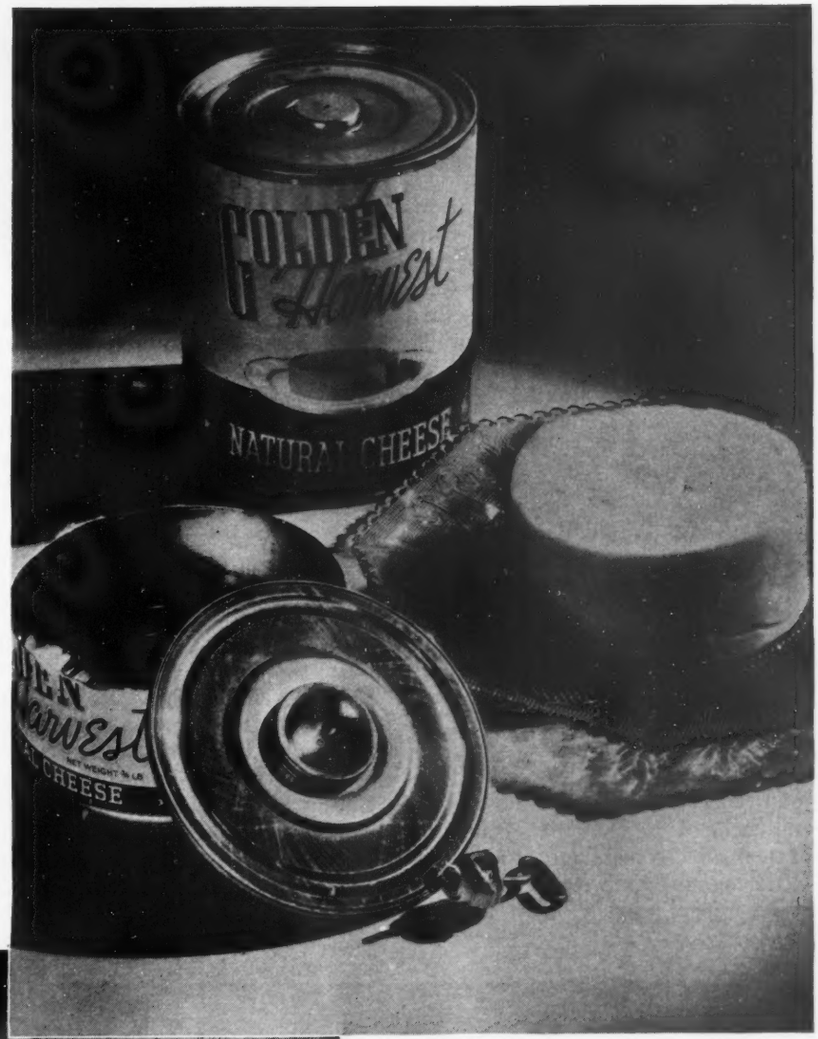
FIG. 4



Food Packages and Products

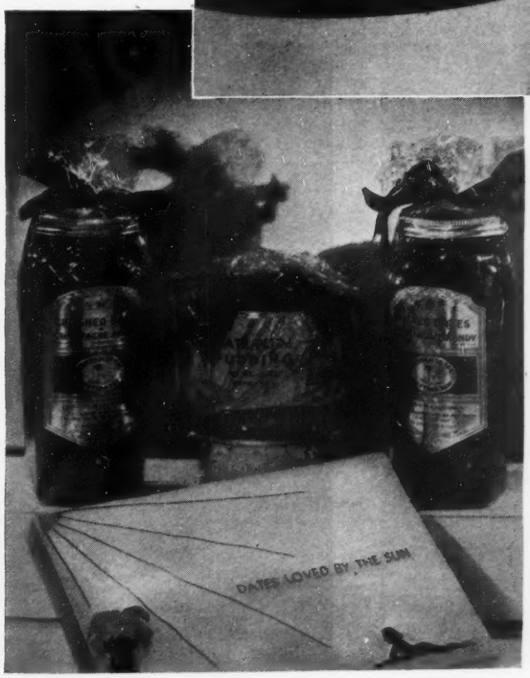
Can-Cured Cheese. In a move to open new markets for its cheddar cheese, Interstate Associated Creameries, Portland, Ore., has adopted the new air-vented can (FOOD INDUSTRIES, July, 1934, p. 308). This organization, which represents 6,000 dairymen in Oregon and Washington, put the can-cured cheese to a local market test with pleasing results. So it decided upon wide distribution of ¾-lb. and 2-lb. natural cheeses in the containers.

Quite an attractive label has been created for the can by using a narrow band of dark color at the bottom and a wide light band above. Stylish, easily read lettering together with an illustration of the cheese completes the design.



Dates in Brandy. From Garden of the Setting Sun, Mecca, Calif., comes something intoxicatingly refreshing in fancy foods. These take the form of pitted dates not only packed in Champagne brandy but arranged in the jar after the manner of olives. Then there are crushed dates, likewise immersed in brandy in a glass jar. This company also produces crushed dates in Champagne brandy and in syrup form for ice cream manufacturers and soda fountains, as well as crushed dates for confectioners.

Being luxury foods, these products demand packages with a copious quantity of eye-appeal. Such containers have been created by using glass jars wrapped in yellow transparent cellulose twisted above the closure and tied with a ribbon of brown cellulose which matches the dates in color. The labels are in gold, brown and red. This same treatment is applied to the company's boxes for dates and for date plum pudding.



Dated Lard. Lard has joined the ranks of packaged perishables dated for consumer protection. J. A. Black, Seattle, Wash., uses this merchandising method to let housewives know when the dealer is selling them lard old enough to have acquired some degree of rancidity. Seattle Packing Co. packs the dated shortening for Mr. Black.

Volatile Preservative. Application of a volatizing preservative on a commercial scale is being tested by Oregon Fruit Products Co., Salem. The idea is to preserve without the use of either heat or refrigeration barrels of berries for preserves, jams and pies. To that end, the company has made shipments in 50-gal. barrels to a num-

ber of cooperating preserve manufacturers.

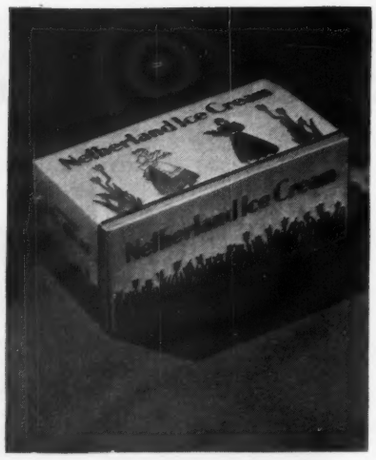
This much is known. The product, packed in ordinary barrels, has kept well under high temperatures in open storage during the hot summer months. Further, a finished product has an appearance equal to or better than that produced from cold-pack berries by the vacuum-pack method, the Oregon company reports.

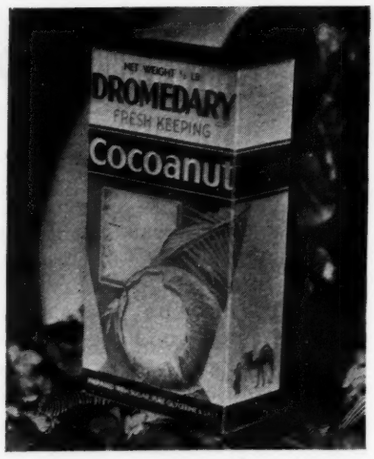
For bakers, the method is advantageous in that they can open a barrel and use out of it from time to time until consumed, without cold storage.

The preservative is not injurious to health, it is said, and with the application of heat it volatilizes and passes into the atmosphere. It is held to be the cheapest known method of fruit preservation, and if usable commercially will broaden outlets.

Fruit preserved in this manner will not become a retail seller, because it is unattractive until after the application of heat.

Two Good Wine Bottles. Containers which make their contents stand out among competing products on the retailer's shelves and which convey the impression of high quality have been developed for Widmer's Wine Cellars, Inc., Naples, N. Y. The containers are of two types, one being a broad decanter with pleasingly curved panels, the other a ribbed bottle of the demijohn type. Capsules over the closures and necks of the containers contribute to their effectiveness and provide protection against tampering. Small labels give a finishing touch.

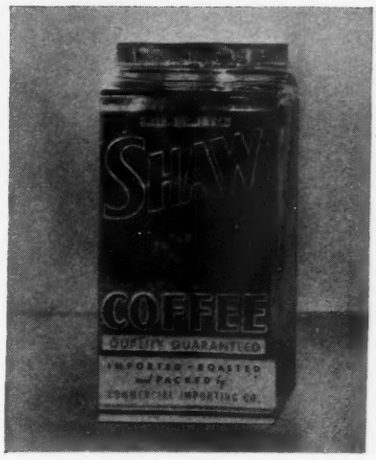


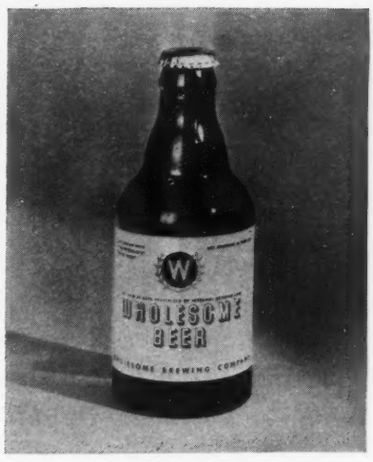


Made It Better. Neither the design nor the trade name stood out on the ice cream carton formerly used by Netherland Ice Cream Co., Syracuse, N. Y. To get around this sales handicap, the company redesigned the package, using strong color contrast with simple, clear-cut ornamentation. A light-yellow background sets off the blue, red, green and white of the "Dutch Twins," the name of the ice cream and the decorative border of tulips.

Improves on Success. Selling through house-to-house agents, Zanol Products Co., Cincinnati, built a big demand for its Marshmallow Creme. But instead of being satisfied, the company decided to move a greater volume to market with the aid of a larger, more appealing container. Accordingly, it adopted the "Tip Top" jar with a bail and a knife-opening cap. Twice the size of the 16-oz., round Mason jar used originally, the new package appeals to the consumer as a handy storage container or pantry jar. Zanol has made effective use of glass to display the enticing appearance of the Marshmallow Creme.

Coconut in New Box. Not content with the fact that 1935 was its biggest tonnage year in history, Hills Brothers Co., New York, simultaneously brings out a more attractive coconut package and cuts the price of the food. The improved package contains the traditional blue, yellow and brown design of the company, and it has a window which permits the appetizing white shreds to exercise their "buy-me" appeal. A sealed transparent cellulose wrapper covers the window and makes the entire package moisture-proof.





Coffee in Foil Bag. Another coffee packer has adopted a "metal" bag. Commercial Importing Co., Seattle, Wash., went to this type of package to supplement its more expensive vacuum-jar packs and reach the medium-price market. The foil bag was adopted because the company believes it to have good protective value and because the shiny silver surface with its blue, green and red printing makes a striking design.

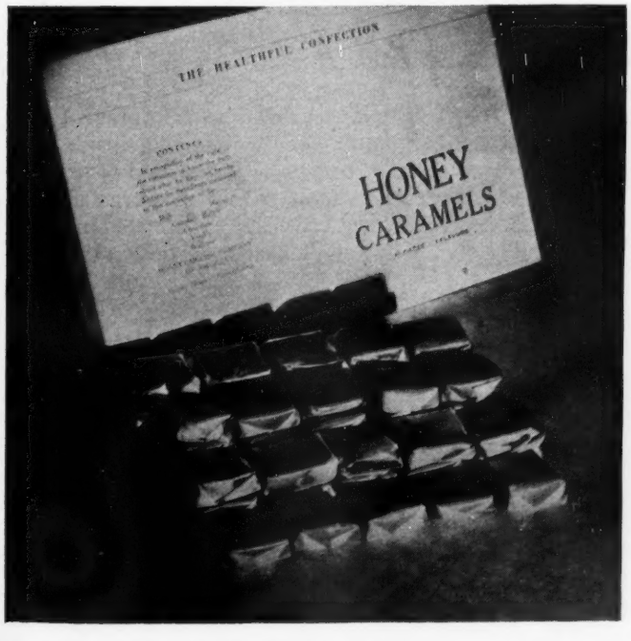
Health Candy. Two-way appeal is put into the confection of Honey Caramel Company of America, Honey Brook, Pa. In addition to being a sweet, the candy embodies the much talked-about health value of honey. Wrapped in sealed transparent cellulose for product protection and enhanced attractiveness, the yellow box which carries the confection to the consumer contains 40 pieces in three flavors. The ingredients—milk, honey, coconut butter, chocolate, vanilla and walnuts—are printed on the package.

New Beer Bottle. Brewers no longer will have to worry about whether to use a one-trip or a returnable container for beer. They now may have both types in one. Owens-Illinois Glass Co., Toledo, has brought out "Steinie," a short, light-weight bottle costing the same as the no-return "Stubby." It is designed to operate on standard bottling lines with a minimum of adjustments. The bottle is 7 in. tall, or 2½ in. shorter than the standard bottle, and a filled carton weighs only 37.1 lb.

Aluminum Beer Can. The scrap for the beer-container market goes merrily on, with another contestant about to enter the field. Crown Cork & Seal Co., Baltimore, soon will introduce an aluminum-plated can for the brewers' beverage. It will be some time, probably six months, before a plant can be equipped to produce this container, but meanwhile the company will manufacture beer cans made of regular tin plate and lined with a specially developed plastic. These cans should be announced within the next two or three months.

Technically Better. Triple protection for the product plus real convenience for the consumer combine to give an effective new package for the cereal of Wheatena Corp., Rahway, N. J. The most important changes made to acquire these attributes are the addition of a glassine bag inside the regular chip-board carton and the use of a new lift top. The glassine retains the flavor of the food while protecting it against moisture and insects. The lift top enables the consumer to open the package merely by pressing with the thumb at one point and lifting up. It provides at the same time a convenient and workable reclosing lid. The outer covering for this package comprises a printed glue-tight wrapper which contributes to the ease of opening and gives additional strength, together with a neat, attention getting appearance.

The production line for forming, filling and sealing the package functions on the unit method, with six machines operating in coordination to turn out either 30 or 60 packages a minute.



Insulated Trailer Bodies

Deliver Perishables in Good Condition

Tractors Are Converted Trucks—Cracked Ice Is Summer Refrigerant—Cans of Boiling Water Used in Winter — Payload Doubled

NINETEEN Mack trucks owned by National Tea Co., Chicago, were on the verge of becoming obsolete—the Illinois Legislature had passed a law prohibiting a speed of over 10 m.p.h. on solid-tired trucks. So the company wisely decided to convert the trucks into pneumatic-tired tractors and use them in conjunction with new semi-trailers fitted with insulated bodies.

The Macks, when used as trucks, each weighed 13,800 lb. empty, including the body, and carried a payload of 10,000 lb. to give a gross weight, loaded, of 23,800 lb. Converted to a tractor, the chassis weight is reduced to 9,700. The semi-trailer with body weighs 8,400 lb. giving an unladen weight of 18,100 lb. But the semi-trailer has a payload capacity of 20,000 lb., or exactly twice that of the truck before conversion.

The main item in the modernization of the four-cylinder Macks, put into service at various dates between 1920 and 1929, was the fitting of pneumatic tires all around. This, with a shortening of the wheelbase and a change in the gear ratio, gave a tractor top speed of 28 m.p.h., with a fuel consumption of 3 or 4 miles to a gallon. Other work done, besides a reconditioning of the motors, included the fitting of new wheels, fenders, electric lighting equipment, booster brakes and the lower halves of the connecting fifth wheels. The semi-trailers, also mounted on pneumatics, have automatic safety brakes controlled from the tractor cab.

Thus, the net result of the modernization, with the change to pneumatic tires and the conversion from conventional trucks to tractor semi-trailers, was to double the load-carrying capacity and almost treble the maximum road speed. The units are well under the Illinois 40-ft.-overall-length law, being 32 ft. 6 in. long, 8 ft. wide and 11 ft. high.

The new semi-trailers, which are Lapeers, are of the full-automatic type. This means that when the tractor and semi-trailer is connected or disconnected, the small wheels supporting the front end of the semi-trailer are automatically lifted off the ground or lowered to it without manual effort. With the semi-automatic type, that work has to be done by means of a hand crank working through gearing.

The new tractor-trailer units carry groceries, produce, bread and perishables the year round and are limited to a 70-mile radius from the National Tea warehouse. When deliveries are made to points beyond that, the same semi-trailers are used with more modern, higher-speed tractors to reduce the running time between stops.

Before the older Macks were converted to tractors, each was fitted with a rack-sided body with tarpaulin cover and sides as shown in an accompanying illustration. This type of body provided little protection to the goods in either extremely hot or cold weather. Therefore, when the conversion was made, modern insulated bodies were mounted on the new pneumatic-tired semi-trailers.

THE bodies were built by the Highland Body Manufacturing Co., Cincinnati, and are of the entirely enclosed, or panel, type. They are 20 ft. long and 8 ft. wide, outside, with an inside clear height of 6 ft. Each body has a side door on the right, with double doors and an outside tailgate at the rear. Both sets of doors are carried on Hansen hinges and have Miner pressure-locking fittings with three points of support. The latter type of fittings are used to prevent the doors from warping and to insure a good door seal.

Each body is insulated but not refrigerated in the general sense of the term. For lightness, the sides and roof are made of 16 and 18-gage aluminum. Two inches of Dry Zero insulation are used in the front, rear and sides and $2\frac{1}{2}$ in. in the roof. The floor is insulated with 1 in. of Masonite.

The vertical wall insulation which comes in the form of a blanket or pad, is furnished with a sealing flange to go against the body posts, thereby insuring a minimum of heat leakage. This insulation is protected by a $\frac{1}{4}$-in. fir sheeting covered by 28-gage galvanized iron to form the inside lining of the body.

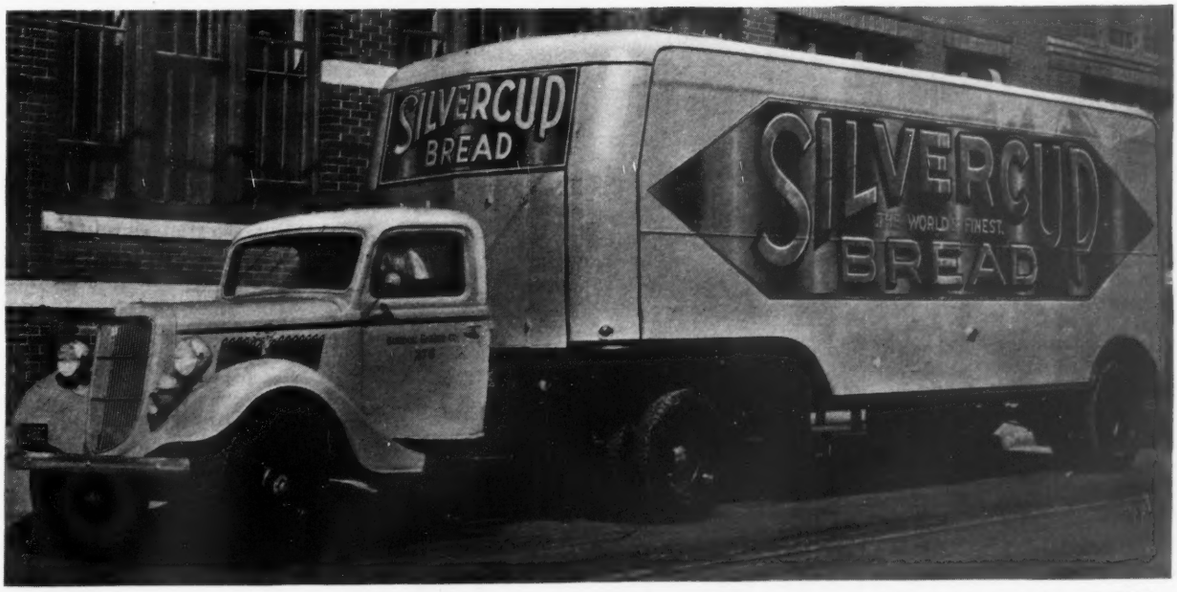
The floor from outside to inside consists of a 26-gage galvanized-iron pan; 1 in. of Masonite aphalted around the edges to assure its being waterproof; an air space; a fir flooring; and finally, on the top, a $\frac{3}{16}$-in. Duraluminum pan turned up all around the edges to prevent water from seeping into the insulation.

THE insulation helps to prevent extreme heat or freezing inside the trailer bodies. When a load of perishables is to be carried in extremely hot weather, crushed ice is sprayed into the body and the trailer is allowed to stand with the doors closed. Before the load is put in, the doors are opened and light racks laid on the floor. Opening the doors permits the melted ice to flow out and leaves the unmelted ice beneath the racks. Thus produce, most of which is iced, is delivered in better condition than with the old-type bodies.

In the winter, milk cans filled with boiling water keep the perishables inside the bodies from freezing, even in the most severe weather.

Before . . . (left): One of nineteen Mack trucks before conversion into the pneumatic-tired tractor of short wheelbase shown below. The body on this truck offered little protection to perishables in either extremely hot or cold weather.

After . . . (below): One of the new tractor, semi-trailer combinations which carries a load of 20,000 lb., double that of the conventional truck above. Note especially the change in body design to the closed panel type. It is fully insulated. For perishables, cracked ice is used as a summer refrigerant, while cans of boiling water prevent freezing in extremely cold weather.



An imposing transfer unit used by Gordon Baking Co. to transport 4,380 loaves of hot bread between Detroit and Flint, Mich., a round-trip distance of 125 miles. It consists of a Ford V-8 tractor and a Fruehauf semi-trailer. The trailer body is 18 ft. long, has side panels of aluminum, is completely insulated with 1½ in. of corkboard and carries a payload of 11,570 lb.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

How Best to Provide Salesmen With Cars

Question No. 15

1. Is it best for the company to own the car and pay all the expenses incidental to its operation; to pay only a certain part of the expenses; or to have the salesman own the car and pay him so much per mile or per week?

2. Is the best method also the most economical?

3. If the car is company-owned and maintained, what precautions can be taken to prevent its being used by the salesman for his personal affairs or pleasure?

4. How important do you consider the advertising value of a salesman's car, and how may the greatest advertising value be obtained from it?

Changing to Private Cars

MY EXPERIENCE has been entirely in the matter of supplying cars for field men and plant managers.

No doubt the most economical method is to furnish the transportation if the cheapest equipment to operate is purchased, if reasonable care is given such equipment and if it is used only for business.

We have found, however, that there are so many factors entering in—such as personal choice of car, abuse of car (especially if the one preferred by the user is not furnished) and use of car for pleasure—that so far as possible we are encouraging the use of personally owned cars.

I understand the situation with reference to our salesmen's cars is no different.

We still furnish some cars, but not nearly as many as we formerly did, and though we have not made any set rule we are gradually working more and more to the policy of having our men furnish their own transportation, we paying them on a mileage basis.

As a rule I do not think there is much advertising value in a salesman's car. I think there are as many instances when the car is a discredit to the company as there are when it is a credit. This, of course, is my own personal opinion.

Perhaps one of the greatest arguments against company-owned cars is the use of such cars for the salesman's personal pleasure, or that of his family, and I haven't yet found a way to stop it, although strict instructions are given to every employee using a company car to the effect that such car must be used for business only.—A. E. HANSEN, *Libby, McNeill & Libby, Chicago, Ill.*

Uses Various Methods

I DO NOT believe, for ordinary small mileage such as street salesmen cover, that it is desirable to pay on a mileage basis. We make flat allowances per month for men working in the city and the immediate vicinity. They own their own cars and are obliged to stand the entire expense of upkeep. They must take out insurance, preferably with the company's insurance brokers, for such hazards and such amounts as we specify. For outlying mileage we have two different rates. For cars priced under $1,200 we pay a certain rate per mile, and for cars having a new cost of over $1,200 we pay a higher rate. In some instances where we accumulate a considerable mileage in the course of a month's driving, the company furnishes the car and stands all the expense.

Which method is most economical depends entirely upon the type of service for which the car is used. We feel that at the present time we are following the most economical methods. Company-owned cars left entirely in charge of the salesmen at all times are a "headache" for the management as a general rule, particularly when they are permitted to take them home nights and keep them over the week ends.

We do not, at any time, demand that any of our salesmen, whether driving company-owned cars, or privately-owned cars, use them for advertising purposes. They carry neither notations on the outside of the car nor tire covers of any description. At times when we have a sales drive on we use small windshield strips or bumper cards. Use of these items is optional with the salesmen.—J. H. SEBA, *Manager, San Francisco Ice Cream Division, Golden State Co., Ltd., San Francisco, Calif.*

Company Cars Cheapest

THE experience of the Produce Division of the Borden Sales Co., Inc., New York, in relation to salesmen's cars used from retail branches throughout the country in the sale of butter, eggs and poultry, is that a company-owned car provides the cheapest means of transportation. We also believe it is the most desirable method of furnishing passenger transportation, from the standpoint of company advertising.

The lower cost of maintaining company-owned cars is due in part to the company rule that all such cars must be returned each night to the company garage or to the public garage in which the company's trucks are stored. This permits the cars to be maintained under the company's 1,000- and 5,000-mile inspection system, insuring proper lubrication and greasing and resulting in the detection of minor troubles before they develop into costly repair jobs.

Bringing the cars in each night also prevents unauthorized personal use by the salesmen.

By owning the cars, the company can have them painted its standard colors, the same as used on retail delivery trucks. Thus, the passenger cars fit into the general automotive set-up of the company. This procedure also makes the cars stand out from privately-owned cars and tends to prevent unauthorized use of the cars on personal business during the working day.—Jos. HUSSON, *Automotive Supt., Borden Sales Co., Inc., Produce Division, New York, N. Y.*

Advertising Is Handicap

IN the vast majority of cases, our salesmen own their own automobiles. We require the salesman to cover his car with sufficient liability insurance, the company contributing approximately one-tenth of the cost of such insurance.

As to how much a salesman should be paid for the operation of his car on company business, this is a matter open to discussion. We feel that approximately $12 per week is an amount which amply covers the expenses of operating a comparatively small car. We naturally would not follow this method of procedure if we did not feel that it was the most satisfactory and most economical, all things considered.

In the few cases where the company owns the cars, we require that the cars be stored in the company's garages at night.

Although there undoubtedly is a certain amount of advertising value in a salesman's car, we have never used such cars

in this way, as we feel that the handicap to the salesman in getting about the territory quickly more than outweighs the advantages. The handicap to which I refer is the inability of the salesman to use certain streets should his car be considered a commercial vehicle bearing commercial advertising.—E. B. LEWIS, Jr., *Vice-President, Pioneer Ice Cream Brands, Inc., New York, N. Y.*

Conspicuous Cars Bad

IN reply to your questions concerning the best method for providing salesmen with cars: It has been an issue for some time in our company whether it is cheaper to furnish the salesmen with cars or to pay them mileage for the use of their own cars.

We have now only a few company cars in this service, but we are paying mileage to possibly 25 salesmen for the use of their own cars. At one time I estimated that by furnishing all salesmen with company cars, taking the mileage as 10,000 miles per year, we would be able to furnish twenty cars for approximately $500 a year each. But in checking over the miles used by the various salesmen, at 5 cents a mile, which we allow them, we find that no substantial saving would have been made because there are not 10,000 miles at an average used on this rental basis. The reason I figure that it would be an approximate of 10,000 miles for our company-owned cars is due to the fact that it is almost impossible to make them refrain from using company-owned cars for other purposes, where, on the other hand, it is not likely that they turn in any other miles than are actually company miles when we are paying them mileage. Therefore, I do not believe it would be possible for me to answer questions 1, 2 and 3 completely.

Regarding question 4: At one time we had our company cars painted our standard colors, the same as the trucks. The salesmen objected to this because they were too conspicuous on any route which they were trying to cover secretly. Also, when parking in front of a door or place where a complaint was being adjusted, they felt that the neighbors knew their mission and that it was not favorable advertising. Therefore, all company cars today are painted a regular black, or dark, color, with merely "Hathaway's Bread" on the door. In this manner the sales managers are able to cover routes secretly as well as park without being conspicuous.—D. R. BOYER, *Superintendent of Motor Vehicles, Hathaway Bakeries, Inc., Cambridge, Mass.*

Trying Company Cars

IN ANSWER to your questionnaire regarding salesmen's automobiles, we have been trying to solve this problem for some time.

1. Until a few months ago we operated on the plan of having the salesman-owned car, and we paid either a mileage rate or a monthly rate, depending upon territory covered.

2. We are not sure that this is the most economical method, and are now supplying some salesmen with company-owned cars and are closely watching maintenance costs. But we have not had an experience over a sufficient period of time to properly answer your question.

3. This, of course, is a matter of supervision. Company-owned cars should only be used for company business, and the only way to arrive at the definite costs on the operation is to prohibit their personal use.

4. We do not consider the salesman's car of very much advertising value in urban districts. The nature of the salesman's work in the city influences us to have his vehicle as dignified as possible, eliminating any special paint job or advertisements. In the country districts, where salesmen are required to carry supplies and very often our products in refrigerated containers, we use a different type of car known as the sedan delivery type. This, of course, has advertising value.—E. J. MATHER, *President, Southern Dairies, Inc., Washington, D. C.*

Next Question

QUESTION NO. 16

Factors to consider in selecting trailers

1. What principal factors lead to the choice of trailers (either semi or four-wheeled types) in preference to trucks with two or three axles?

2. What do you consider the minimum load (in tons or cubic feet of volume) at which semi-trailers become preferable to conventional trucks?

3. What factors of operation, other than minimum load, limit the use of semi-trailers for retail food delivery?

4. What effects have road grade and road surfaces upon trailer selection?

5. When does a four-wheel trailer, pulled behind a conventional truck with body and load, become preferable to a tractor semi-trailer hauling the same total payload?

Company Cars Cost Less

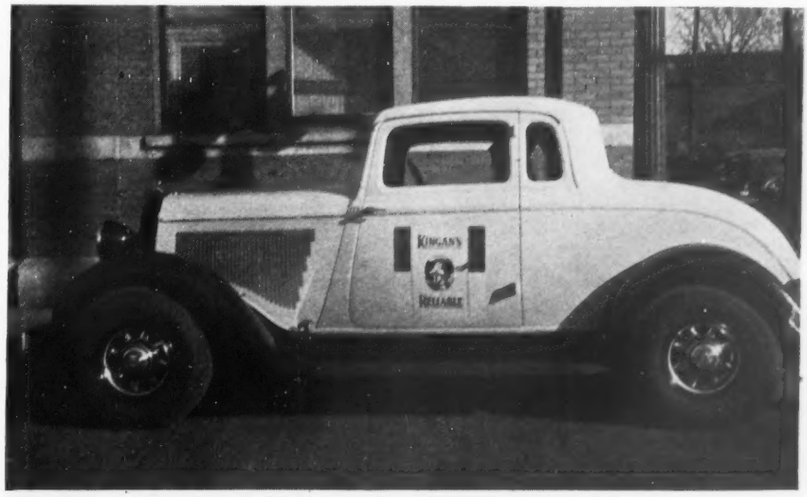
I BELIEVE our company should own the cars and pay all expenses of operating them, as we can get two years or more out of a car at a very reasonable cost.

Our salesmen drive about 20,000 miles a year per man. At 5 cents per mile it is far cheaper to own the cars than to pay an allowance.

We do collect from each man who drives a company-owned car a certain amount toward the insurance, this in proportion to the amount he uses the car privately, though it is very little. If a man is away on vacation we expect him to pay for the gas and oil used during that time.

I think that by owning the cars we can keep them looking better and have better cars than if the salesmen owned them. We find, with a few exceptions, that a salesman who has the car for personal use does not overdo this confidence, as his company mileage and personal mileage is reported daily and summed up each week.

Having the car always clean and in good mechanical condition, with good paint and tires, is a better advertisement for the company than having a sign on both sides of the car. Sometimes, signs on cars act as a boomerang by letting competitors know you are calling on some of their customers, or by warning people, whom you may have a bill against, to be out or say they are busy when you call.—W. J. DESMOND, *Manager, General Ice Cream Corp., Hartford, Conn.*

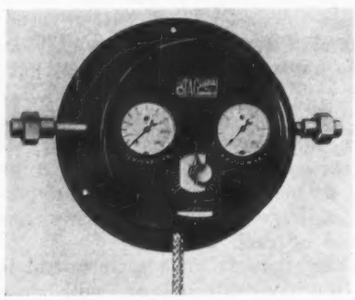


Kingan & Co., Indianapolis, believes there is considerable advertising value in salesmen's cars. The design on the door not only identifies the company but ties in with the design of Kingan packages.

NEW EQUIPMENT
for Food Manufacturers

Automatic Controller

A NEW instrument for automatic control, known as the Tag No. 40 controller, has been brought out by C. J. Tagliabue Mfg. Co., Brooklyn, N. Y. Its principle of operation is the same as that of other Tag instruments, but it is particularly designed for compactness and accessibility, and has a tube system that is easily interchangeable. A spring lever designed to eliminate all lost motion multiplies the movement of the capsular spring. It is claimed that the new instrument has high sensitiveness and permanent accuracy. It comes in nine temperature ranges, between 80 and 360 deg. F., and three pressure ranges between 0 and 300 lb. per sq.in.



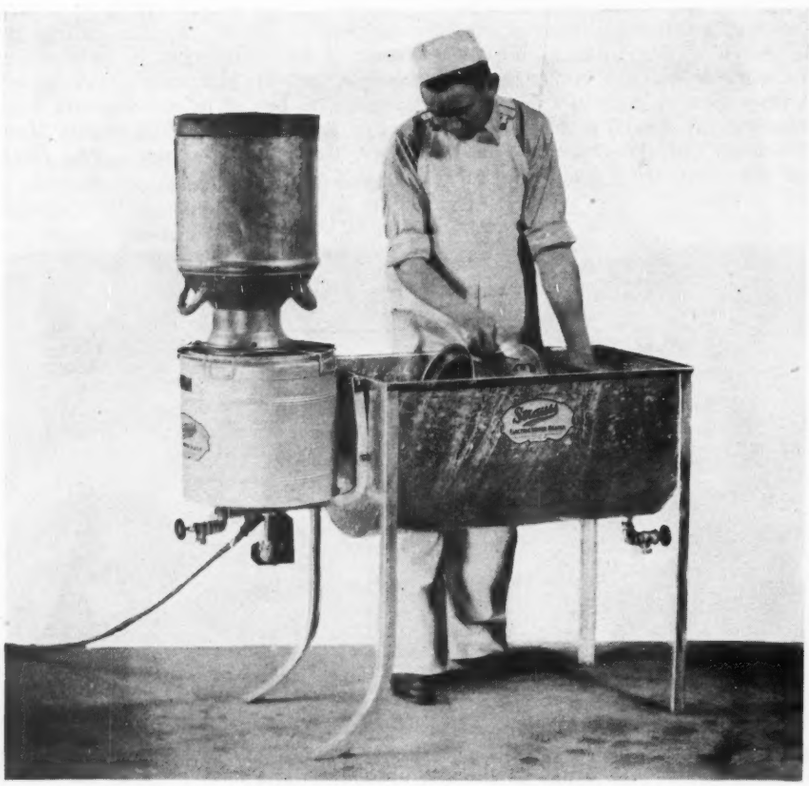
Automatic controller.

Electrical Outlets

FOR offices and similar spaces where flexibility as to the location of electrical outlets is desirable, "Plug-In Strip" is announced by National Electric Products Corp., Pittsburgh, Pa. This is a flat-faced conduit, designed to be set into the wall or base-board, all the way around a room, and providing outlets every 6 in. Its advantage lies in the fact that it permits electrically-operated equipment to be plugged in at any desired location.

Washer and Sterilizer

AN ELECTRIC water heater and steam sterilizer, designed especially for washing and sterilizing dairy equipment, has been developed by Strauss Electric Appliance Co., Waukesha, Wis., a subsidiary of Universal Milking Machine Co. It combines the functions of an electric water heater, an utensil wash tank, an electric steam generator and a steam sterilizing cabinet in one piece of equipment. The heater is mounted on a hinged bracket on one end of the wash tank. The heater can be lifted on its hinged bracket and the heated water allowed to flow into the wash tank. The steam generating fixture can produce steam in three minutes. It is claimed that, with this apparatus, as many as 25 milk cans can be washed and sterilized in one hour.



Washer and sterilizer.

Small Pulverizer

LABORATORY or small production work is accommodated by a new 8 in. "Mikro-Pulverizer" developed by Pulverizing Machinery Corp., Roselle Park, N. J. This unit is similar in design to the large "Mikro" machines made by this company. It is designed to handle a wide range of materials in quantities from a few ounces to several hundred pounds, and can be adjusted for grinding all the way from a fine powder to a coarse granular product.

Various arrangements of feed drive are available to meet service requirements. Oversize and dust-tight, double-row, self-aligning ball bearings are used. Usually, a 3 hp. motor with flat belt drive is used. Rubber-tired casters can be furnished when portability is desired.

Milk Evaporator

A STAINLESS steel milk evaporator of vacuum pan type is announced by Arthur Harris & Co., 212 North Curtis St., Chicago, Ill. The engineering features of this evaporator are uniflow coils, horizontal entrainment separator, and counter-current, floor-operated condenser. It is built in all sizes up to 6 ft. diameter. For example, the 42-in. diameter evaporator, built of stainless steel throughout, has four coils. Two hundred gallons of whole milk is evaporated at a 3 to 1 ratio in 74 minutes, with a steam pressure of 4 lb. in the coils, a 26-in. vacuum, and temperature of milk in the pan at 119 deg. F.

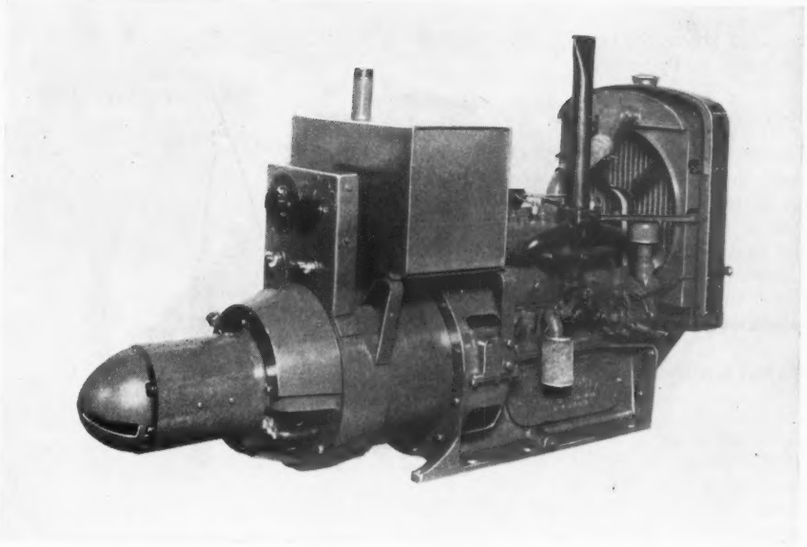
Stainless Rail Tubing

THIN-WALLED, stainless steel tubing for use as hand-rails, foot-rails, and for similar purposes, has been developed by Allegheny Steel Co., Brackenridge, Pa., under the name of "Allegheny Metal Architectural Tubing." Carbon steel inserts are fabricated into the tube when applications demand additional strength and rigidity. The new tubing is avail-

able in the following outside diameters: ⅝ in., ¾ in., ⅞ in., 1 in., 1¼ in., 1½ in., and 1.9 in. Certain sizes of square and rectangular shapes will also be produced.

Engine Driven Welder

A NEW 200 ampere special engine-driven "Shield Arc" welder is announced by Lincoln Electric Co., Cleveland, Ohio. It is said to be the lowest-priced welder of this type ever placed on the market. It has a welding current range from 60 to 250 amperes and is said to supply a uniform current for welding with bare or heavily-coated shielded arc type electrode in all sizes up to ¼ in. The engine is a four-cylinder Waukesha, delivering 23 hp. at 1,400 r.p.m.



Engine driven welder.

Portable Capper

SEMI-AUTOMATIC type portable cappers, suitable for handling all shapes and types of caps from 10 to 90 mm., have been developed by the Ludcke Corp., Watertown, Mass. The new device, called the "Kinex," is intended for tightening screw caps, previously placed by hand, to any desirable tightness. Up to 100 caps per minute can be tightened with this machine, which is particularly useful for designs of cap or container that cannot be handled by fully automatic cappers. It is suspended from the ceiling by chains, hook and spring; or from a suitable bracket. Radius of operation permits use over a 4-ft. length of conveyor belt. A ¼-hp. motor furnishes the power.

Traveling Tray Oven

FIRED with gas or oil fuel, a new traveling tray oven for bakeries, has been announced by Read Machinery Co., Inc., York, Pa. It has one or more furnaces or combustion chambers, depending upon size of the oven, built within it. This is said to give improved heating efficiency. It is also claimed that the oven is explosion-proof. Another claim is that the oven is steam tight. It comes in a range of sizes, with trays from 9 to 22 in. deep, and will accommodate any kind of goods to be baked.

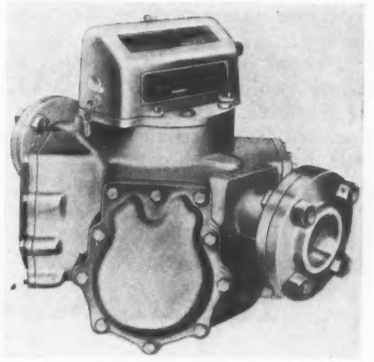
Bag Filling Machine

BAGS are extracted flat from a magazine, opened and formed by a new Model B-9 fully automatic bag filling machine brought out by Cartoning Machinery Corp., Newport, R. I. The machine then moves the bags along beneath several chutes, from each of which a controllable quantity of material is discharged into each bag, filling them to the exact amount required.

Following the filling process, the top of the bag is folded twice, adhesive is applied, the bag discharged to a conveyor and carried along until the adhesive is set. It is claimed that the method of filling, by discharging a fixed amount into the bag at a number of filling stations, avoids clogging and settles the material so that each bag is properly filled.

Liquid Meter

FOR measuring practically all liquids used in the food industry, the Pittsburgh Equitable Meter Co., 400 North Lexington Ave., Pittsburgh, Pa., has developed a meter of the piston displacement type. Originally developed to the specifications of the U.S. Treasury Department, for use in measuring beer for taxing purposes, this meter is claimed to be the most accurate yet developed. Sizes are available for measuring up to 300 gal. per minute flow. Meters can be furnished in a variety of materials suitable for resisting the corrosive action of various foods.



Piston-displacement type liquid meter.

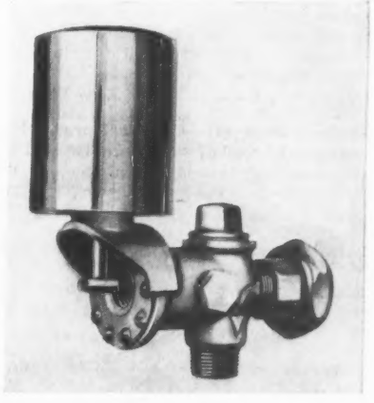
Small Scale

A SMALL bench scale for general utility purposes has been developed by Kron Co., Bridgeport, Conn. Platform size is 16½x18½ in. and capacity ranges from 50 to 125 lb.

Control Valve

NEW features are embodied in a control or automatic shut-off valve announced by Lammert & Mann Co., 238 North Wood St., Chicago, Ill. Interchangeable elements are provided for air, steam-pressure, water-pressure or electrical control. The valve can be adapted to automatic operation, remote control, or automatic operation plus an interlock with a manual-reset device.

This valve has only two moving parts. The operating lever, actuated by the control device, moves a needle valve. All parts are made of corrosion resisting materials.



Control valve.

Rolling Grille

A PROTECTIVE device for door and window openings, which provides a safeguard against trespass, has been developed by Kinnear Manufacturing Co., Columbus, Ohio. It consists of a counterbalanced, steel rolling grille, which can be quickly raised or lowered, and when closed can be securely locked. It is composed of round steel bars connected by pressed steel links, with apertures too small for entrance of a hand or missle. It travels in guides mounted on the sides of the opening and rolls up on a heavy spiral

mounted above the lintel. It is operated manually, or by motor.

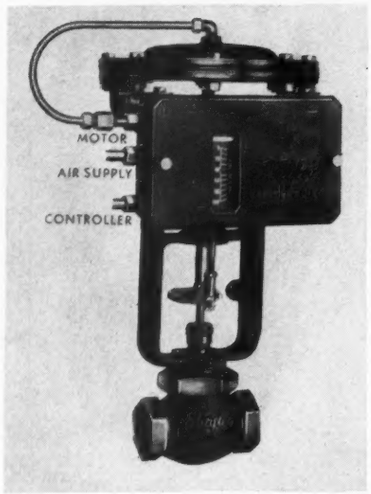
Storage Batteries

THREE new storage batteries for replacement in light trucks have been added to its battery line by B. F. Goodrich Co., Akron, Ohio. These are designed to fill the gap between the passenger-car-type battery often used in light trucks, and the heavy-duty batteries for large trucks and buses.

Valve Control

AS A MEANS of closer, more accurate positioning of the disks of diaphragm-operated valves, in applications involving reasonably large time lags, Taylor Instrument Companies, Rochester, N. Y., have developed the "Valv-Precisor." This is an auxiliary control device, made as a separate instrument, to be used where the application demands that valve-stem friction and diaphragm-motor hysteresis be overcome in order to obtain precision control.

The unit is shown in the accompanying illustration, in place on a diaphragm operated valve. It can be used with any air-operated controller but must be so placed that a direct, rigid connection is always maintained with the valve stem. A 25 lb. per sq.in. air or gas supply is used.



Valve control device.

The device is recommended by the manufacturer for all processes which have time lags or heat capacities demanding a low or medium controller sensitivity, provided that load changes are negligible or infrequent. It is not used on processes involving large time lags and load changes. It is claimed that it will increase the accuracy of valve disk positioning 50 times.

The Manufacturers Offer . . .

Pumping Equipment—Bulletin 157, of the Morris Machine Works, Baldwinsville, N. Y., lists and describes centrifugal pumping equipment, dredges and steam engines made by this company.

Labels—A 48-page catalog entitled "Ever-Ready Labels Go Places and Do Things," illustrates many of the different types of labels made by Ever-Ready Label Corporation, 141 East 25th St., New York, N. Y.

Soybean Products—Chemical properties and methods of use of "Soybean Brew Flakes" are described in a bulletin recently issued by Archer-Daniels-Midland Co., 927 Blackhawk St., Chicago, Ill.

Valves—Corrosion-resistant valves of special cast metals and alloys, for all industrial purposes, are listed in a new 24-page bulletin of the Wm. Powell Co., 2525 Spring Grove Ave., Cincinnati, Ohio.

Compressors and Pumps—Three new bulletins of Worthington Pump & Machinery Co., Harrison, N. J., as follows: W-102-B1, describing horizontal duplex piston pumps for general service at pressures up to 200 lb. per square inch; L-611-B5A, single horizontal single-stage steam and motor-driven compressors for air or gas; L-611-B4A, single, horizontal, single-stage steam and motor-driven compressors for air and gas, in larger sizes.

Agitating and Mixing—Catalog No. 355, the "Agitator and Mixer Book," is a 52-page publication of the Patterson Foundry & Machine Co., East Liverpool, Ohio, discussing its complete line of agitating and mixing equipment.

Unit Heaters—Catalog No. 236, issued by Electric Air Heater Co., Division of American Foundry Co., Mishawaka, Ind., is a 24-page data book, illustrating and describing "Electromode" industrial, portable and "Built-In-Wall" all-electric, fan type unit heaters.

Laboratory Equipment—Three new bulletins of Bausch & Lomb Optical Co., Rochester, N. Y., as follows: Bulletin of Type 8 laboratory microscopes; Bulletin describing the surface illuminator for opaque specimens; Bulletin describing the ortho-stereocamera and ortho-stereoscope or three-dimensional record at 1 to 24 diameters.

Diesel Engines—Catalog No. 779, the Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y., describing Type RHB diesel engines in sizes from 100 to 800 hp. for industrial and other stationary applications.

Pumping Units—A centrifugal pumping unit for small and moderate capacity, the "Electropump" embodying a centrifugal pump with directly mounted electric motor in capacities up to 150 ft. head is described in Bulletin D-45 by Lawrence Pump & Engine Co., Lawrence, Mass.

Temperature Controllers—In Bulletin 202, a 20-page illustrated publication, Foxboro Co., Foxboro, Mass., discusses potentiometer controllers for industrial temperatures.

Arc Welding—"Automatic Arc Welding by the Electronic Tornado" is the title of a new 48-page book recently issued by Lincoln Electric Co., Cleveland, Ohio, and discussing automatic carbon arc welding.

Rendering Equipment—In a new folder, Darling & Co., 4201 South Ashland Ave., Chicago, Ill., describes the "Lowry" circulating rendering unit for lard.

Zinc Alloy Die Castings—Two new books of the New Jersey Zinc Co., 160 Front St., New York, N. Y., deal with zinc alloy die castings. The first is a research bulletin discussing the properties and use of "Zamak" alloys; and the second entitled "A Visual Report of Progress" is an 80-page booklet illustrating and describing many recent applications of die casting to equipment manufacture.

Filter Aid and Insulation—In a booklet entitled "Research Puts the Diatom to Work," Johns-Manville, 22 East 40th St., New York, N. Y., discusses the history, development and industrial uses of diatomaceous earth as a filter aid, insulation and for other purposes.

Unit Heaters—In a new catalog, No. 635, Modine Mfg. Co., Racine, Wis., describe their line of direct-suspension type unit heaters for industrial application.

Carton Sealer—In a new folder, Stokes & Smith Co., 4919 Summerdale Ave., Philadelphia, Pa., illustrates and discusses the "Neverstop" carton sealer for filling by gross weight, net weight or volume.

Filters—Two new bulletins of T. Shriver & Co., Harrison, N. J., have been issued as follows: A bulletin describing Shriver wine filters and illustrating their use, listed as Circular No. 104; and Circular No. 105, a general bulletin discussing the application of Shriver filters for food manufacture.

Plastic Anniversary. The Bakelite Review, Vol. 7, No. 3, celebrates the Silver Anniversary of the Bakelite Corp. and discusses the history and development of phenol formaldehyde plastics.

Rendering Equipment—Bulletin No. A-49, issued by the Cincinnati Butchers' Supply Corp., Cincinnati, Ohio, discusses balanced power rendering equipment for packing houses.

Pneumatic Industrial Truck Tires—Pneumatic tires for use on industrial trucks, wheelbarrows and similar equipment, are illustrated and specified in a new circular issued by Saginaw Stamping & Tool Co., Saginaw, Mich.

Sterilizer—Oakite Products, Inc., 22 Thames St., New York, N. Y., has issued a bulletin describing Oakite Bactericide, a sterilizer providing a more active form of available chlorine for use in dairies and other food industry plants.

Brine—In a recently issued booklet, international Salt Co., Inc., Scranton, Pa., discusses the "Lixate" process for making salt brine.

Process Equipment—F. J. Stokes Machine Co., Philadelphia, Pa., has issued a new 48-page catalog describing their complete line of process equipment for drying, extracting, solvent recovery, condensing, pumping, evaporating, mixing, forming, and so on.

Speed Reducer—Catalog No. 1519, a recent publication of Link-Belt Co., 307 Northeastern Ave., Chicago, Ill., deals with single, double and triple reduction herringbone gear speed reducers for large speed ratios and heavy shop loads.

Books Received

ALL ABOUT TEA. By William H. Ukers. Published by Tea and Coffee Trade Journal Co., 79 Wall St., New York, N. Y. 1935. Vol. I, 570 pp., Vol. II, 576 pp. 7¾x10½ in., cloth, illustrated profusely. Price, $25 for set.

For 25 years the author has collected source material and compiled information preliminary to the publication of this exhaustive treatise. No profound examination of the contents of this work is necessary to convince one that as many as twelve years would be required for the sorting and classifying of the information and ten years for the writing of manuscript; particularly since the history, production, technology, social aspects and marketing customs and practices of tea have been chronologically traced since the legendary date of 2737 B.C. up to the time the book went to press.

Vol. I, comprised of three books (27 chapters), covers the historical, technical, and scientific aspects of the industry and commodity. In Vol. II, the three books (27 chapters) deal with the commercial, social, and artistic aspects. A 68-page appendix to Vol. II adds value to the treatise through instrumentalities of a Chronology of Tea, a Dictionary of Tea, an extensive Bibliography, and an Index.

THE THEORY OF EMULSIONS AND THEIR TECHNICAL TREATMENT, 3RD EDITION. By William Clayton. Published by P. Blakiston's Son & Co., Inc., 1012 Walnut St., Philadelphia, Pa. 1935. 458+IX pp., 6½x10 in., cloth, illustrated. Price $8.

As chief chemist and bacteriologist for Crosse & Blackwell, Ltd., the author is thoroughly familiar with emulsions and their behavior in food manufacture and processing. As author of other books on the fundamental technology of foods he has evidenced a decidedly practical as well as scientific approach to the presentation and discussion of technical problems pertaining to food products.

In the instance of this particular book its value is indicated by the fact that it, the third edition in twelve years, is a thorough revision of previous editions; that it is being made available in a French translation; and that both a German and a Russian translation was made of the second edition. Copious references are made to existing literature of world wide selection. Instead of being compiled in bibliography form the references are given as page footnotes.

ABSTRACTS OF LITERATURE ON THE MANUFACTURE AND DISTRIBUTION OF ICE CREAM. Vol. VI (1934-1935). Published by International Association of Ice Cream Manufacturers, Washington, D. C. 1935. 230 pp. 8¾x11¼ in., cloth. Illustrated appendix. Price $5.

A new feature in this biennial compilation of abstracts of literature pertaining to the production and marketing of ice cream is an 11-page summarizing and interpretive introduction by A. C Dahlberg of the N. Y. Agricultural Experiment Station at Geneva. This introduction covers the newer and most fundamental contributions which have been made to the science of the industry. Particular attention is given to the composition of milk products, milk solids, ice cream flavors, processing of the mix, freezing procedure, sanitation and bacterial control methods, and food value of ice cream.

The abstracts themselves cover 350 published articles by 385 authors in all phases of ice cream manufacture published during 1933 and 1934 plus some of 1932, which were not available when Vol. V was published.

These compilations make data and results of all available research and experimental work accessible to the manufacturer and distributor in convenient form. A 26-page appendix presents in tabular and graphic form specific information and data of fundamental value.

CO_2

(Continued from page 67)

a modification of the cold process better adapted to large operations was installed.

At Worcester, the method as modified avoids the necessity of sterilizing immediately after pressing and also avoids the necessity of maintaining aseptic conditions before and during storage. It also simplifies the bottling operations.

These improvements are based on the fact that the micro-organisms contained in the freshly-pressed grape juice are rendered completely inactive by dissolving 1.5 per cent by weight of carbon dioxide in the liquid. If this is done, the yeasts, fungi and bacteria need not be immediately removed.

In the Worcester plant, the freshly-pressed juice is first filtered in a coarse filter to remove all insoluble material and mucilaginous matter. It is then run into storage tanks, where it is saturated with CO_2 gas at 113.8 lb. per sq.in. pressure at 59 deg. F. This results in adding 1 lb. of the gas per 8.4 gal. of juice, or 1.5 Kg. per 100 litres, giving the 1.5 per cent required.

At this pressure it is naturally impossible to use wooden tanks. The tanks used are of steel, lined with a neutral substance to protect the flavor of the grape juice. There are 30 of these tanks in the plant, each of 11,000 gal. capacity.

Because of the inhibiting effect of the carbon dioxide on micro-organisms, the grape juice can be stored as long as desired, without changes occurring. It is necessary, however, to keep the gas pressure on the tanks constant, and this is done by adding additional gas whenever the pressure falls.

Before the grape juice can be bottled, the carbon dioxide must be removed. In the installation at Worcester, about 90 per cent of the gas is recovered, effecting a considerable economy in the operation of the plant.

While the carbonic acid renders the micro-organisms inactive, it does not kill them. Hence they must be removed before bottling. This is done with the "Seitz E.-K." fiter. Also, from the time the juice is taken from storage until it is sealed in bottles, its handling must be carried out in such a way that no yeasts, fungi or bacteria can enter it. This is accomplished at Worcester in wholly automatic machinery, which cleans and sterilizes the bottles, filters the juice to remove the inactive organisms and fills and seals the bottles under sterile conditions.

By this method, as carried out at Worcester, South Africa, by the Co-operative Wine Growers Association, it has proved to be possible to pack and distribute grape juice that is unchanged in any way from the freshly-pressed product.

Carbon dioxide gas for years has been dreamed of as a means of preserving foods. In some cases it has met with success and in others it has failed. In this case the success in the use of CO_2 as an industrial antiseptic—an easily removable preservative—depends chiefly on the very high gas pressures employed which are more than double anything used in the carbonated beverage industry. Secondarily it depends on the acid nature of the grape juice; and thirdly on the lack of any organic structures that might be destroyed by enzymes. For even under this pressure of CO_2 it is our opinion that tissue enzymes will not be inhibited though all bacteria and yeasts might be effectively stopped.

Under these very high pressures of CO_2, our view is that the food is preserved in a "pickle" of carbonic acid. A few years ago a complete review of the successes and failures of gases as food preservatives was prepared by FOOD INDUSTRIES *but on advice of legal counsel it was not published.*

Some day a part of that study will appear under the title of "Giving Them the Gas"—the part that deals with successes. The failures will have to await a few funerals.—EDITOR.

IDEAS from

Air-locks used to save cold.

Saving Cold

AIR-LOCKS that effect an appreciable saving in refrigeration have been made and installed by Smith Sanitary Dairies, Doylestown, Pa. All the small doors through which cans and packages are passed out of the building for loading the trucks are equipped with these cold savers.

Built of soft wood and looking something like a box, the air-lock is open at the end adjacent to the opening in the wall and has two swinging doors at the opposite or room end. These doors are equipped with tension springs which act to close the doors as soon as the can or package has passed through them. Thus there is little time for warm air to enter, or for cold air to leave the room.

One end of the air-lock is fastened to the wall and the other end is held up by wooden supports. The top, to which one end of each spring is fastened, extends beyond the sides to which the doors are hinged to provide positive and free spring action at all points of door travel. About once a week frost collecting on the doors must be removed.

In the illustration, showing the air-lock there may also be seen a canvas covering over a door through which men enter and leave the room. This is used because the door opens to the outdoors, and it serves to keep large quantities of warm air from entering the room every time the door is opened.

Conditioning New Bake Pans

NEW pans for bakery use can be improved by burning out, if the job is done properly. If not properly done, the pans will be ruined.

These pans are made of thin gage sheet steel, lightly tinned. As soon as this tin coating wears off, the bread will stick to the pan, the pan will rust, and many other troubles will occur that make the use of such worn pans impracticable.

As tin melts at 450 deg. F., the burning out, or conditioning, of the pans must be done carefully. Should the temperature be allowed to go high enough to melt the tin, the pan is spoiled. Also, if too strong a solution of alkaline cleanser is used in cleaning the pans, they will be spoiled by a similar removal of tin.

In burning out or conditioning, the purpose is to form a thin, protective coating over the tin. Pan manufacturers often supply directions for burning out the pans they supply. If not, some other method should be used. One correct method for doing this is as follows:

Heat the pans to 375 deg. F. If the oven is heated to 400 deg. F., there may be some spots, as near the flue, that will be at a higher temperature, and the pans in that area will be damaged. Before heating, the pans should be wiped clean of dust or factory grease, and placed in the oven at 375 deg. F. for three or four hours, or until they have taken on a bluish tint. Remove from oven and grease immediately with a melted shortening. Then return them to the oven for about five minutes, to allow the shortening to penetrate the pores of the metal.

Always bear in mind that once the pans are overheated, or the tin has been removed through the use of a too strong lye or other alkali, there is nothing that can be done to make them give satisfactory baking results.

Beer For Fly Bait

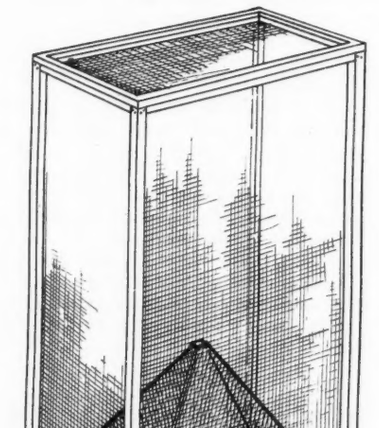
THE proper time to catch flies is before they get into the plant, believes Christ Kunzler, who has built himself a good meat business in Lancaster, Pa. To accomplish this, Mr. Kunzler sets large, screen-wire fly traps at the back of the plant and he baits these with beer. The bottom of the trap is pyramid-shaped, with a hole into the trap at the apex of the pyramid. The trap is set over a shallow pan containing beer. Flies, attracted by the brew, and perhaps made dizzy by it, find their way through this hole into the trap.

Improved Heater Performance

IMPROPER circulation of air is one of the most frequent causes of heating system trouble. This condition is occasionally found where forced circulation from unit heaters is employed. Poor location of the heater or obstructions placed in the normal path of air flow will cause dead spots which may be either hot or cold, depending upon the direction of air circulation and the character and location of the obstruction.

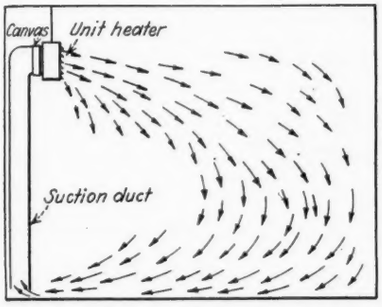
This condition was discovered in the offices of a large food manufacturing plant. A relatively cold layer of dead air near the floor resulted in continual complaints of cold feet from the office force. This dead spot due no doubt to the interference of the office furnishings with normal air circulation from the heaters, was of a sufficiently low temperature to cause acute discomfort in very cold weather.

To remedy this condition, a duct



Sketch of trap for flies, used with beer bait.

Practical Men



Arrangement of duct that improved heater operation.

was installed, as shown in the accompanying sketch. This duct, extending from the heater inlet to a point a few inches off the floor, eliminated all complaints. A short section of canvas, placed between the duct and the heater inlet, minimized any objectional vibration which otherwise might have been transmitted from the heater to the sheet metal duct.—S. H. COLEMAN, *Waynesboro, Va.*

Liquid Soap

A SATISFACTORY liquid soap can be made in the following manner: Slice four bars of a cocoa hard water soap (such as Kirk's Cocoa Hard Water Castile Soap). Cover with 3 qt. of water and allow to soak overnight. Then heat to boiling. Cool and add water to make 1 gal.

This formula gives a free-lathering soap solution suitable for use in food plants where the water is hard. The cost will be roughly 40 cents a gallon and will generally be found to be more satisfactory than some liquid soaps at considerably higher costs.

For shop and engine room use where mineral oils and greases are encountered make up the same formula, using four bars of a tar soap such as Grandpa's Tar Soap in place of the Cocoa Hard Water Soap.

In large cities, where the cost of transportation is a small item because of proximity to manufacturers of liquid soap, the production of one's own soap is not as profitable as in those plants at a very considerable distance from the soapmaker, because in the latter case a very considerable sum of money must be paid for freight on the water contained in the liquid soap.

Installing an Air Receiver

WHENEVER compressed air receivers are to be installed, remember to select a location that is as cool as can be found. There is always some moisture present in compressed air, and locating the air receiver in a cool place will help to precipitate this moisture to the bottom of the tank, where it can be withdrawn through the drain cock from time to time.

There are two practical reasons for having a receiver of ample size. The first is that the pulsations in the air created by the compressor are more fully neutralized by a large receiver; and the second is that when a large receiver is used, a sudden peak load or heavy demand on the receiver is met with far less variaton in pressure.

However, as a general rule, it is best to have an air compressor large enough to meet the heaviest demand that may be put upon it, rather than to depend upon a small compressor and a very large receiver. It must be admitted, though, that when cases arise where large amounts of air are needed for very short intervals of time, and where the heavy demand of this nature arises only occasionally, it can be taken care of with a smaller compressor and larger receiver, the latter storing air in times of light demand to meet the heavy pull when it comes.

As to the safety valve on an air receiver, it should be kept in good working order and tried out occasionally, to make sure that it will not stick when emergency arises. The pressure can be raised once in a while to force the valve to function, thus insuring that it is not stuck tight.—JOHN E. HYLER, *Peoria, Ill.*

Mending By Welding

CRACKED through half of its diameter, the lid of a large pressure cooker was recently repaired by welding in the plant of a large food company. Weighing over 600 lb., this lid had been swung back too far, a hinge ear had been broken off and a crack developed from the center to the rim.

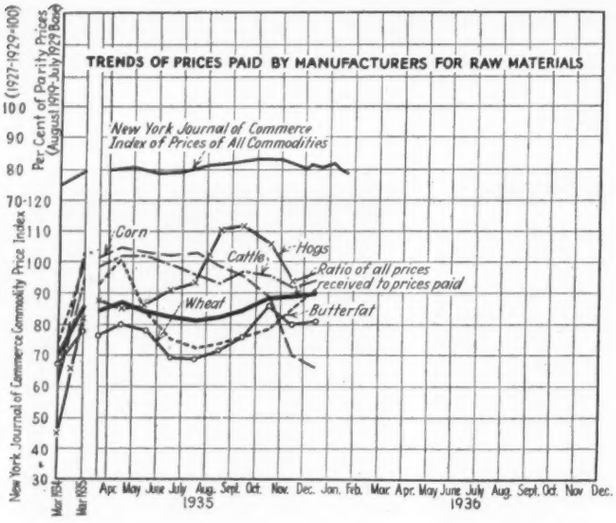
It would have taken months to procure a new lid to replace the damaged one. So welding was decided upon. The lid was preheated sufficiently to take the chill out of it, in order to insure against any further cracking. A $\frac{1}{4}$-in. diameter hole was then drilled just beyond the end of the fracture in order to obviate any further extension of the existing crack. The walls of the crack as well as the hinge ear that had been broken off were then beveled.

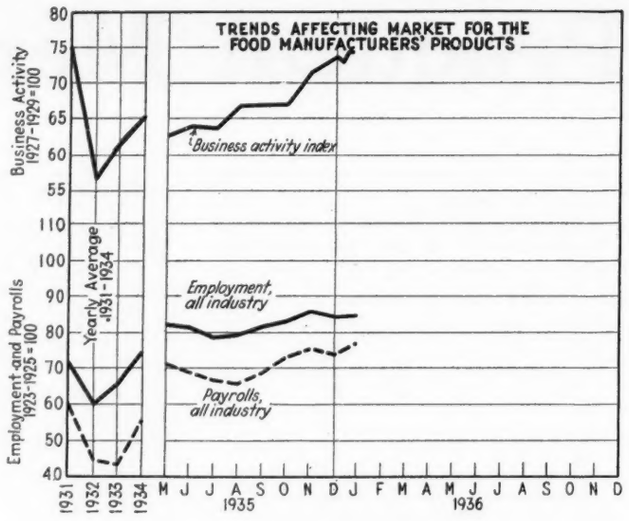
Welding was of the bronze type, using the oxy-acetylene method. Twenty pounds of bronze welding rod were employed in making the repair. The total time required to complete the job was five hours, and the lid was then ready to be put back on the kettle, which was then put back in service. The accompanying photograph shows the lid after the welds were completed, but before they had been smoothed off.

Floor Brick Table Tops

SAUSAGE stuffing tables in meat packing plants must be constructed of sanitary material. This can be accomplished by making them of the hard type of floor brick commonly used in meat packing plants. The result is a table top that is inexpensive to construct and that has proved to be satisfactory in such plants as Louis Burk, Inc., and John J. Felin & Co., both of Philadelphia. Plants in other branches of the food industries will, without doubt, find this type of construction useful for some purposes.

Pressure cooker lid repaired by welding.


TRENDS OF PRICES PAID BY MANUFACTURERS FOR RAW MATERIALS
New York Journal of Commerce Index of Prices of All Commodities
Corn
Cattle
Hogs
Ratio of all prices received to prices paid
Wheat
Butterfat
New York Journal of Commerce Commodity Price Index (1927-1929=100)
Per Cent of Parity Prices (August 1909-July 1929 Base)
1935
1936



BUSINESS TRENDS

SLIGHT recession in activity marked general business during the first month of 1936. Deterrent factors were (1) legislation before Congress and the Supreme Court, (2) decline in commodity markets, (3) falling off in automobile production, and (4) continued unsettlement in Europe. Encouraging factors were continued steel mill activity, a 3 per cent increase in carloading over December, and the buying mood of the public.

Contrasted with the 5.17 per cent increase during January a year ago, the *Business Week* index of general business activity this year declined 0.93 per cent during the month ending Jan. 18. However, at 74.2 per cent of "normal," the index is still 14.4 per cent higher than last year.

Wholesale prices for all commodities, as reported by the U. S. Department of Labor, for the month ending Jan. 18, fell off 0.25 per cent; farm products rose 1.03 per cent, while food prices dropped 2.81 per cent. During the five weeks ending Jan. 25, the New York *Journal of Commerce* general index of weighted prices fell 1.71 per cent; that for grain advanced 3.19 per cent, and the food price index took a nose dive of 6.79 per cent.

Construction News

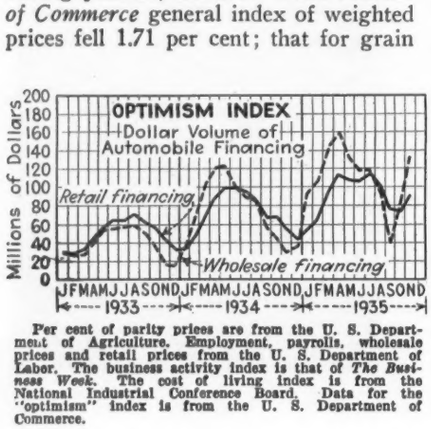
	Pending (thousands)	Awarded January (thousands)	Total Awarded 1936 (thousands)
Bakery	$539	$350	$350
Beverages	952	548	548
Canning and Preserving	....	....	....
Confectionery	124	....	....
Grain Mill Products	1,912	105	105
Ice Manufactured	262	37	37
Meats and Meat Products	98	191	191
Milk Products	474	164	164
Miscellaneous	713	107	107
Total	$5,074	$1,502	$1,502

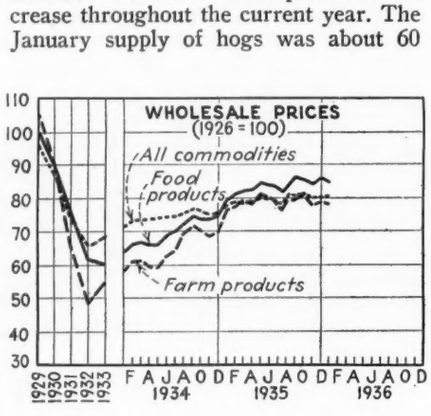
Among the individual branches of the food industries, perhaps most interest attaches to the situation in the meat and meat products division. It is evident that the bottom has been passed, so far as the supply of livestock is concerned. Livestock numbers are expected to increase throughout the current year. The January supply of hogs was about 60 per cent of normal, and is increasing. Cattle marketing in 1935 was near normal, but the supply of first quality animals was unusually small. This condition should be overcome in the current year, and a liberal supply of good beef become available. Cattle on feed are now 41 per cent above the January, 1935, figure. Normal supply of lamb is expected, with the number of lambs on feed higher than a year ago.

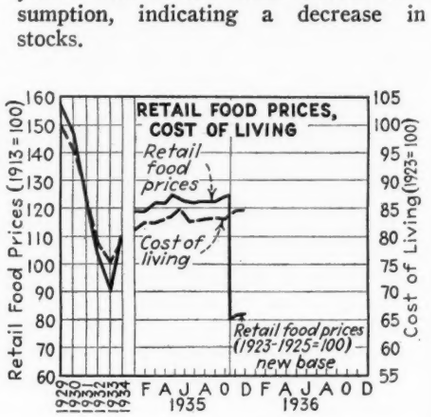
Milk and butter production are expected to overcome the shortage that developed during the last quarter of 1935. Numbers of dairy cattle are near normal and will increase by spring. Meanwhile, the production per cow is above normal, and with improved feed conditions, the yield of butterfat should increase.

●

WORLD SUGAR production for the 1935-36 crop year is forecast by Dr. Mikusch, a European authority, at 25,612,000 metric tons, compared to 24,904,000 metric tons in the preceding year. This is less than current consumption, indicating a decrease in stocks.







Per cent of parity prices are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data for the "optimism" index is from the U. S. Department of Commerce.

Keeping Up With the Field

- *Canners talk progress as New Deal interest dies*
- *Administration stews over AAA replacement plan*
- *Food bill not forgotten—delayed for a purpose*
- *Brewers oppose identity standards—FAA insistent*
- *Swiss treaty favors lard, wheat and other foods*

Canners Show Progress

FOLLOWING a program of progress instead of building New Deal defenses, canners and allied groups staged something of a record in food-industry conventions at Chicago, Jan. 19-24. Attendance, variously estimated at from 15,000 to 25,000, was by far the largest on record. Sales of canning machinery and equipment exceeded last year's total of $650,000 by more than $1,000,000, according to estimates of association officials and company representatives.

As part of the progressive program, results of much research were presented. Informal conferences were held on production problems, and these were so well attended that larger quarters were necessary. Everywhere there were evidences of great changes coming over canning technology. Lobby gossip revealed that many canners are prosecuting research in a big way, and new procedures and new equipment are being developed. Machinery manufacturers, too, are bringing out some new and worthwhile innovations.

In addition to canning technology, the convention program placed emphasis on descriptive labeling. Howard A. Orr, president of National Canners' Association, explained that further experiments would be made during this year to develop a fairly uniform system. A resolution by the canners urged early adoption of informative labels.

Dean G. Acheson, former under-secretary of the Treasury, warned canners that some form of crop-control substitute for the AAA would be found before long. He also said that a particular hardship would be worked on the canning industry by the Social Security Act because of seasonal operations.

Senator Burton K. Wheeler warned that disaster lies in further monopolies in business, and cited statistics to prove that the moderate-sized business was the more profitable.

The general consensus of all speakers was that 1935 was a most satisfactory year. Prices of canned foods are expected to remain fairly stable this year, in the opinion of many authorities attending the convention, although a slight increase may occur in some lines.

The canners have become perturbed over the entry of the government into the canning business in many localities, and a resolution adopted at the closing session voiced disapproval of government competition with private industry.

All officers were reelected, and one new director, E. E. Chase, Richmond-Chase Co., San Jose, Cal., was added to the board.

Among the new developments seen at the machinery and supplies exposition were two "pipe" blanchers. These took the form of a continuous 4-in. pipe, looking much like a long-flow dairy pasteurizer. Peas are pumped through the pipe in water, the water being kept at the proper blanching temperature by live steam. The machines are Berlin-Chapman and Chisolm-Scott units, the two makes differing in that the former operates with constant temperature and variable flow while the latter utilizes constant time and variable temperature.

White Cap Co. startled the crowd with a display of 30-day old milk which was as fresh as fresh milk. This was bottled by vapor sealing, a process which sterilizes the cap and creates a vacuum which exerts an inhibitory effect on bacterial growth. The method does not preclude need for refrigeration.

A new vapor-seal capping machine was exhibited by Crown Cork & Seal Co.

Where Food Bill Stands

RUMORS have been flying thick and fast about the Food and Drug Bill, these being inspired by delay on the part of the House Interstate Commerce Committee in reporting out the bill. Reliable sources of information, however, say that the sub-committee in charge of the bill will meet in two or three weeks to report out a practical and enforceable measure, with advertising under the jurisdiction of the Food and Drug Administration. One of the reasons given for lack of haste in consideration of the bill is that committee members are stall-

DISCUSSING DRINKS *Harris & Ewing*

Representatives of the beer and wine industries have been spending much time in Washington recently, what with the Federal Alcohol Administration in the process of formulating regulations covering their products and packages. Here are George P. McCabe, brewers' counsel (left), Judge M. Devries, vintner's counsel, Senator William H. King and George W. Blanchard, brewers' attorney, discussing problems of the industries.

ing to avoid having to consider other bills. It is predicted that the bill will be passed this session of Congress, which probably will last until May.

Post-AAA Situation

FORCED for sake of political expediency to replace the AAA program thrown into discard on Jan. 6 by the Supreme Court, administration leaders are at loss for a plan that can be put through Congress. Crop control through soil conservation measures, which at first appeared to be the savior, was rejected by the Senate Agricultural Committee. Another possible solution involves little AAA's in each of the 48 states, but Washington observers believe this doomed to failure. They predict that the only plan that can be put across will be a compromise measure involving several factors, such as export debentures, domestic allotments, reforestation, erosion control and what not. And whatever the plan, nothing is expected to be set up before spring, probably after this season's crops are already under way.

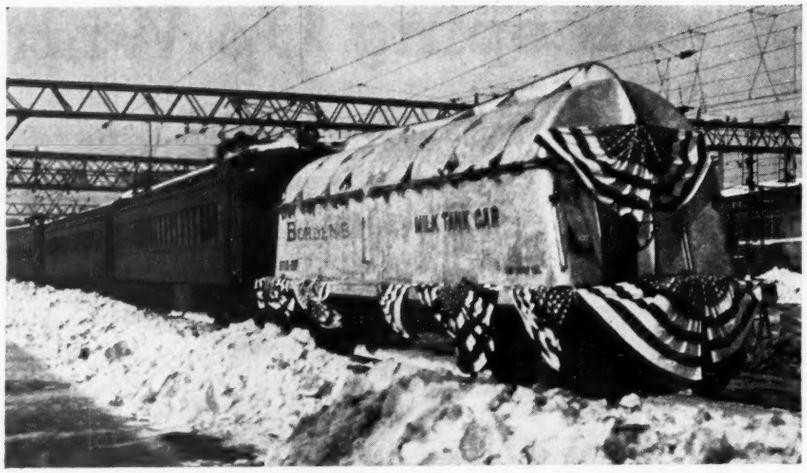
Meanwhile, processers will get back the $200,000,000 of processing taxes held in escrow, thanks to an unexpected order by the Supreme Court. But all is not rosy. Some of this becomes "hot" money when excess profits taxes are taken into consideration. Furthermore, there is a battle among some of the bakers and millers, the bakers claiming that part of the returned taxes should go to them.

Despite destruction of AAA, marketing agreements and orders continue in effect, these covering milk, fruits and vegetables. Sugar quotas, too, are still valid, in the opinion of the Department of Agriculture. Benefit payments to farmers continue through direct appropriations.

Swiss Treaty Favors Foods

BENEFITS to various food industries will come as a result of a reciprocal trade agreement to go into effect with Switzerland Feb. 15. The United States concedes that country reduced duties on Emmenthaler and Gruyere cheese, while Switzerland makes concessions for American lard, wheat, rice, certain fresh and dried fruits and canned asparagus. Switzerland not only agreed to lift the embargo on lard but to obtain 90 per cent of all its lard imports from the United States. In addition, import levies were reduced 50 per cent to $2.94 per 100 lb.

The treaty raises the Swiss import quota on wheat to 4,366,000 bu., maintains the present high import level on fresh apples and pears and increases the quota on prunes to 5,170,000 lb., while reducing the duty to $1.47 per 100 lb. The present duty on raisins is bound against increase, and the quota on dried fruits has been stepped up to 2,425,000 lb. In addition, the duty on dried apricots is cut to $5.88 per 100 lb. The quota on imports of canned asparagus is raised by 772,000 lb., and the present quota on rice is bound against increase.



STREAMLINED FLYER FOR MILK

Borden's "Silver Comet" leaves the station behind a fast passenger train. Flags and pennants used in the "launching" ceremony at Hoboken, N. J., are still attached. The first all-metal, streamlined railroad tank car, it is equipped with passenger train brakes and trucks. The body comprises a steel outside shell coated with sprayed-on aluminum and contains two 3,000-gal., glass-lined tanks. Insulated with 6 in. of cork, the tanks will transport milk as far as 200 miles with not more than one degree rise in temperature. This car is lighter than the wooden type, will have lower repair and painting costs and will give much longer service. Future replacements of the 60 tank cars operated by Borden in the New York area will be sisters of the Silver Comet.

Brewers Oppose Standards

BREWERS refuse to accept the control of identity standards incorporated in regulations proposed for the industry by the Federal Alcohol Administration. They protested at a hearing on Jan. 7-8 that these standards would control the method of fermentation and the alcoholic content of beer, ale, porter and stout and would stifle the brewing art. The brewers also question FAA's admitted purpose of proposing the standards for consumer protection. Indications are, however, that FAA will insist on these standards. But the effective date of the labeling regulations for beer and wine probably will be postponed until July 1. Except for some minor particulars, the brewers endorse the proposed FAA restrictions on "tied" houses and on giveaways.

Meanwhile, brewers' troubles are not lessening. Sentiment is growing in Congress, at least, for placing them under the permit system, as distillers now operate.

Objects to Dairy Probes

NO MORE government money should be appropriated to the Federal Trade Commission to be spent on investigations in the dairy industry. This attitude was expressed in a statement by Milton Hult, president of International Association of Milk Dealers. The chief results of the investigation so far have been to reduce consumption of milk in areas where investigations have aroused the suspicions of consumers, Mr. Hult said. He also criticized the FTC for attempting to indict an entire industry for the unethical acts of a few.

Sues Ice Cream Companies

TRIPLE damages amounting to $54,000,000 are sought of ice cream manufacturers by Mills Novelty Co., Chicago manufacturer of counter ice cream freezers. This company has instituted action in the United States District Court in New York, charging defendants with violation of the Sherman and Clayton antitrust laws. The complaint

Conventions

FEBRUARY

3-5—Associated Bakers of America, Jefferson Hotel, St. Louis. John M. Hartley, 360 N. Michigan Ave., Chicago, secretary.
4-8—Poultry Industries Exposition, Port Authority Bldg., New York. N. Y.
5-7—American Management Association, personnel and office management divisions, Palmer House, Chicago.
10-11—Potomac States Bakers' Association, Lord Baltimore Hotel, Baltimore. Lee L. Robinson, Woodward Bldg., Washington, D. C., secretary.
10-15—Wine and liquor exhibit of National Retail Package Stores' Association, Inc., Grand Central Palace, New York.

MARCH

3-6—Sixth Packaging Exposition, Pennsylvania Hotel, New York, N. Y.
9-12—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago.

covers unfair competition, sabotage, intimidation, boycotting and the promotion of legislation in bad faith.

Forty-two companies are among the defendants, including Borden, Breyer, Hydrox and Castle. The suit is said to be an outgrowth of a similar one in Chicago where Borden won a dismissal because the court lacked jurisdiction.

Builds Case Against Chains

PATMAN'S anti-chain store bill, H.R. 8442, has as yet seen no action at this session of Congress, and it is doubtful if both Houses will get around to passing upon it before adjournment. Nevertheless, the Patman committee continues to build up a case for the bill. Discount lists of about ten more chain organizations are to be introduced into the records to supplement those of A & P, Kroger and Liggett's.

Appearing before the committee recently, A. H. Morrill, president of Kroger, revealed that his company received in 1934 more than $1,000,000 in allowances and discounts. This figure included $236,000 in brokerage profits, $379,000 for quantity purchase discounts and $329,000 for services rendered.

A & P May Decentralize

FACED with excessive taxation in many states, Great Atlantic & Pacific Tea Co. may enter the wholesale grocery business, either converting its stores to voluntary chains or to manager-owned units. This fact was brought out by John A. Hartford, president, in answer to an inquiry by a New York newspaper. With the food distributing organization built up by A & P over 76 years, the company undoubtedly could make the competition very keen for present wholesale organizations. Some food manufacturers, however, see in such a move an opportunity to get broader distribution of products now handled exclusively in A & P stores.

Twenty-two states now have chain-store tax laws, and during 1935 more than 200 bills were introduced in 43 state legislatures.

Wrigley Adopts Pension Plan

"RECOGNIZING the advantage and fairness of social security for workers," Wm. Wrigley, Jr., Co., Chicago, has instituted an old-age-pension plan benefitting more than 1,300 employees. The company has paid $800,000 to an insurance company as the equivalent of back payments to the pension plan, and for future service pensions the employees and the company contribute on a fifty-fifty basis. Employees will be retired at 65, the amount of their pension depending upon length of service and average wage.

Wrigley already has favored its employees with a five-day week, shorter hours, group life insurance and employment insurance.

McGraw-Hill Elects

AT a meeting of the Board of Directors of the McGraw-Hill Publishing Company, Inc., held on Dec. 27, 1935, James H. McGraw, the founder of the company and its head for more than 50 years, resigned as chairman of the board and was elected honorary chairman. He will remain as a member of the board.

James H. McGraw, Jr., who has been connected with the company for the past 20 years, was elected chairman of the board. He has served as treasurer and was executive vice-president and vice chairman of the board at the time of his election.

Malcolm Muir, president of the company since 1928, continues in that capacity.

Vegetable-Oil Taxes

Two new bills for and one decision against is the score for January on taxes affecting vegetable oils. A flat tax on oleomargarine of no less than 10 cents a pound is provided for in a bill introduced by Representative Culkin. Another bill, introduced by Representative Knutson, would increase the processing tax on coconut, sesame, palm, palm kernel and sunflower oils to 5 cents a pound and would place a 5-cent levy on imported soybean oil.

The present 3-cent tax on coconut and palm oil was held unconstitutional by a federal judge in a suit brought by Iowa Soap Co. Much perturbed by this decision affecting a tax which brings in revenue of about $20,000,000 a year, Treasury officials will carry the case to the Supreme Court, if necessary.

Package Jury Named

EVERYTHING is set for the Packaging Exposition to be held in New York, March 3-6. A program covering all phases of packaging has been completed, the space available for exposition booths has been signed up and the jury of awards has been named.

Outstanding representatives for every aspect of packaging are among members of the jury. These include: Gordon Aymar, Blackman Advertising, Inc.; Richard F. Bach, Metropolitan Museum of Art; Edith M. Barber, consultant on home economics; James C. Boudreau, Pratt Institute; Berent Friele, American Coffee Corp.; Alice Hughes, *New York American;* Ray M. Schmitz, General Foods Corp.; Jack Straus, R. H. Macy & Co., Inc.; and William Weintraub, Esquire, Inc.

Tax Regulations Issued

REGULATIONS governing records to be kept by employers subject to tax under Title IX of the Social Security Act (excise tax on employers of eight or more persons) have been issued. The tax applies to the year 1936 and thereafter, but does not become payable until Jan. 31, 1937.

Every person subject to tax is required to keep a permanent record showing: (1) Total remuneration to employees, showing separately (a) payment for exempted services (b) for services performed outside of the United States, (c) for all other services; (2) contributions to state unemployment funds, showing separately (a) payments not deductable from remuneration to employees, (b) payments deductable, (c) payments with respect to exempted services; (3) other information necessary to determine whether a tax is due and, if so, how much.

No particular method of accounting or form of record is prescribed.

●

Concentrates

► GROUND roasted coffee treated with four per cent of a special oat flour is more fresh after seven days than untreated coffee after two days, according to Musher Foundation, New York, holders of a patent on the treatment. . . . Live-poultry dealers in Philadelphia, Pa., and Camden, N. J., must have licenses from the Secretary of Agriculture after Feb. 19; those in Boston, after Feb. 26; in Chicago, after March 4. . . . Application for a motor carrier permit must be filed with the Interstate Commerce Commission by Feb. 12 by those using trucks in interstate shipment.

► PROHIBITION against artificial coloring in orange beverages and bases will not become effective until July 1. . . . International Association of Milk Dealers has organized Milk Institute to promote milk consumption and serve as a clearing house on public matters. . . . Backers and growers of fresh mushrooms have organized under a mushroom section of National Canners' Association.

► EXPLOSIVE hexane gas ignited by a minor dust explosion destroyed the soybean plant of Glidden Co., Chicago, Oct. 7, the Department of Agriculture has found. . . . Three deaths and 205 cases of illness in Rhode Island last spring resulted from the presence of rodents in the plant of a manufacturer of cream fillings, it has been discovered. . . . For three years ending in 1934, imports of frozen and canned tuna represented 27 per cent of domestic consumption.

► NEW YORK'S law authorizing manufacturers with trademarks to fix retail prices of their products has been declared unconstitutional. . . . American Association of Cereal Chemists meets June 1-5, at Dallas. . . . American Bottlers of Carbonated Beverages convenes in Chicago, Oct. 19-23.

Men . . . Jobs . . . and Companies

Industry

• ARMOUR & Co. plans to establish a large American cheese factory in Gallipolis, Ohio.

• BORDEN Co., New York, has dissolved Pioneer Ice Cream Brands, Inc., whose operations will continue under a new Pioneer Ice Cream Division of Borden. The company also is converting some of its Mid-West subsidiaries into branches to simplify its corporate structure.

• BORDEN'S FARMS PRODUCTS Co., INC., is extending the use of one-trip, paper milk containers to northern New Jersey.

• BREYER ICE CREAM Co., National Dairy subsidiary, has taken over the ice cream business of Monmouth Ice Cream Co., Asbury Park, N. J.

• CARNATION MILK Co., Milwaukee, has acquired Oatman Condensed Milk Co., Owen, Wis.

• BUFFALO (N. Y.) FLOUR MILLS Co., a unit of Commander-Larabee Co., has increased its capacity from 1,600 to 5,000 bbl. daily. Machinery was brought from one of the company's plants in the West.

• EMPIRE PACKING Co. is adding three stories to its plant in Chicago.

• FORT PIERCE (Fla.) GROWERS' ASSOCIATION, a unit of Florida Citrus Exchange, will build a $100,000 plant with a seasonal capacity of 750,000 boxes of fruit.

• KELLOGG Co., Battle Creek, Mich., has the right to manufacture and sell "shredded wheat," according to a federal circuit court of appeals ruling in a suit brought by National Biscuit Co. National Biscuit's exclusive right to the name ended with expiration of its patent, the court decided.

• LEVER BROS. will spend about $6,500,000 during the next year to enlarge its plant at Hammond, Ind. The plant will produce vegetable-oil shortening.

• MILWAUKEE CHEESE Co. has purchased the Kraft-Phenix franchise from Green Bay (Wis.) Co. and has opened a branch in Green Bay.

• MONARCH WINE Co. will produce wine from Georgia fruits and berries at its Atlanta plant. Peach wine may be made, utilizing the developments of Montezuma Frozen Fruits Co.

TOM G. SPATES

For the past nine years with Industrial Relations Counselors, Inc., he has been appointed director of industrial relations for General Foods Corp., New York. His appointment is an "expression of recognition that the satisfactory solution of industrial relations problems is one of the primary responsibilities of management."

• NESTLES MILK PRODUCTS, INC., is installing a cheese pressing plant at Sunbury, Ohio, and will make cheese spreads.

• OMAR BAKING Co., Columbus, will open a new unit in Marion, Ohio.

• OWENS-ILLINOIS GLASS Co. has formed a new subsidiary, Owens-Illinois Can Co., and has taken over Enterprise Can Co., near Pittsburgh, and Tin Decorating Co., Baltimore. Fred A. Prahl, formerly with Continental Can Co., is president of the new concern.

• PABST CORP., Milwaukee, will add a mayonnaise and salad department under the management of H. J. Ruckert.

• SNIDER PACKING CORP. soon will begin packing grapefruit juice at its plant in Harlingen, Texas.

• SOUTHERN DAIRIES, INC., has purchased Piedmont Ice Cream Co., Salisbury, N. C.

• SWIFT & Co. is building curing facilities and adding to its hide cellar at Moultrie, Ga. This will cost more than $40,000. The company is spending $15,000 on modernization at Montgomery, Ala.

• UNITED STATES YEAST Co. of New Jersey has acquired Stafford Yeast Co., Stafford Springs, Conn.

• UTAH CANNING Co., Ogden, will locate a cannery at Freewater, Ore.

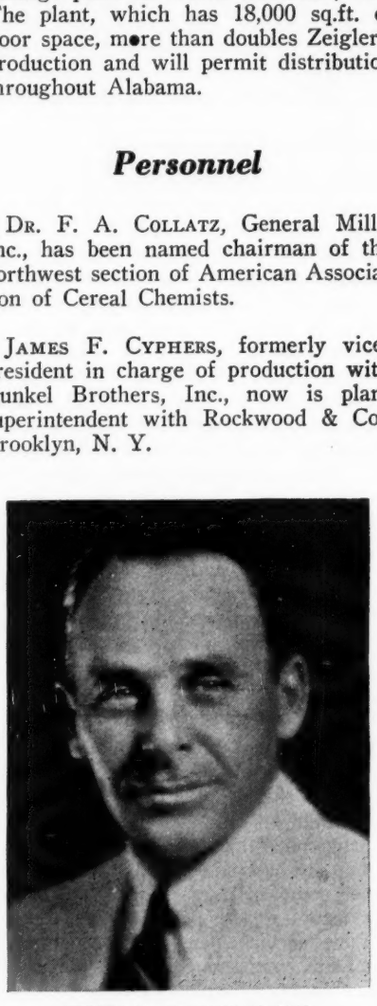
• GEORGE A. WESTON BISCUIT Co., LTD., Toronto, will manufacture biscuits at Battle Creek, Mich. It is spending $350,000 to recondition a plant there.

• R. L. ZEIGLER has opened a modern sausage plant at North Bessemer, Ala. The plant, which has 18,000 sq.ft. of floor space, more than doubles Zeigler's production and will permit distribution throughout Alabama.

Personnel

• DR. F. A. COLLATZ, General Mills, Inc., has been named chairman of the northwest section of American Association of Cereal Chemists.

• JAMES F. CYPHERS, formerly vice-president in charge of production with Runkel Brothers, Inc., now is plant superintendent with Rockwood & Co., Brooklyn, N. Y.



WILLIAM A. MISKIMEN

Formerly president of Illinois Canning Co., he went with Stokely Brothers & Co., Inc., Indianapolis, in 1934, and has progressed from assistant to the president to vice-president in charge of production. His company operates 21 plants.

• DR. P. J. DONK has resigned as production manager of Associated Quality Canners, Ltd., Toronto, to join American Can Co. of Canada.

• CHARLES ELICH, for twelve years superintendent and brewmaster with Premier-Pabst Brewing Co., now is brewmaster at Goebel Brewing Co., Detroit.

• C. E. FENLON, vice-president and production sales manager of Sheboygan Dairy Products Co., has been elected president of Wisconsin Ice Cream Manufacturers' Association.

• J. J. FISHER, Gresham, Ore., heads up Northwest Fruit Barrelers' Association for 1936.

• H. W. HARTLE is the new president of Minnesota Canners' Association.

• DR. N. W. HEPBURN, formerly general manager of Peoria (Ill.) Creamery Co. and more recently executive secretary of Illinois Dairy Products Association, succeeds W. F. Jensen, resigned, as secretary of American Association of Creamery Butter Manufacturers.

• RAYMOND HERTWIG, secretary of the committee on foods of American Medical Association since 1930, is now with Borden Co., New York.

• F. W. HOFFMAN, since 1932 vice-president in charge of pork operations for Cudahy Packing Co., Chicago, has been appointed a director of the company. J. W. MCELLIGOTT, who has been in charge of the produce division, becomes a vice-president.

• FRANK L. KNIGHT, who helped found Knight Packing Co., Portland, Ore., 37 years ago, has retired. Wm. J. Mitchell, with the company 28 years, succeeds him as president.

• JOHN T. MCGREER now is general manager of Beatrice Creamery Co. at Chicago, having advanced from manager of the Eastern division.

• PAUL MERCER advances from manager of the West Sayville, N. Y., plant of Bluepoints Company, Inc., General Foods oyster unit, to vice-president and general manager of the company. He succeeds the late Arthur E. Loring.

• T. G. MONTAGUE, former president of Kennedy-Mansfield Dairy Co., Madison, Wis., and since 1934 general manager of fluid-milk operations of Borden Co., New York, becomes a Borden vice-president.

• BYRON MORRIS, Tuscaloosa, has been chosen president of Alabama Dairy Products Association.

• J. NERNEY, Attleboro, Mass., is the new president of Eastern Soda Water Bottlers. Louis A. Vincent, Auburn, heads up Maine Bottlers of Carbonated Beverages. George A. Groux, Manchester, is president of the New Hampshire-Vermont bottlers' organization and Arthur P. Angell, Providence, heads up the Rhode Island group.

• GEORGE NORRIS recently was made president of C. A. Dury Packing Co., Indianapolis.

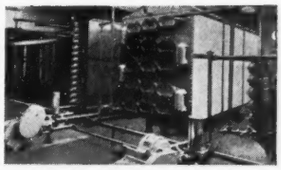
• SAMUEL OPLER recently quit Rockwood & Co., Brooklyn, N. Y., where he was vice-president in charge of package sales.

• WALTER A. REED, president of Lake Odessa Canning Co., becomes president of Michigan Canners' Association.

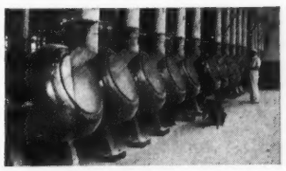
• L. J. SCHUMAKER has been reelected chairman and Henry Stude, president of American Bakers Association. Other officers also were renamed.

• JAMES M. SHRIVER, B. F. Shriver & Co., Westminster, Md., recently was

PUT THIS 27 YEARS EXPERIENCE TO WORK FOR YOU!



DAIRIES



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PACKING PLANTS

FOOD PLANTS

Oakite field and laboratory research has resulted in so many new and easier ways to maintain equipment and food handling surfaces in a sanitary condition that cleaning no longer requires a lot of time and effort. Neither is there need for it to be difficult or expensive.

In dairies, creameries, baking plants, canneries, baking establishments, confectionery plants . . . new developments in Oakite materials are helping to reduce cleaning costs and lengthen life of equipment through safer methods of cleaning.

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elected president of Tri-State Packers' Association, Inc. F. M. Shook has been made secretary-treasurer, to succeed the late C. M. Dashiell, who held the job for 42 years.

• DR. D. STILLMAN is now chairman of the Toronto section of American Association of Cereal Chemists.

• HERBERT N. SWIFT has retired as manager of the Providence (R. I.) branch of Swift & Co. after 47 years of service. He has been succeeded by Edward M. Emery of Chicago.

• PHILIP TALBOTT has gone with American Cone & Pretzel Co., Philadelphia. During NRA, he served as technical adviser to the deputy administrator of the baking code.

• P. Z. TURNER recently became superintendent of Libby-McNeill & Libby's Chicago plant. He has been an operating man with the company for over 30 years.

• W. E. WALLACE, Circleville, recently was elected president of Ohio Bakers' Association.

• H. O. WARNEKA, Iowa Falls, heads up Iowa Manufacturers of Carbonated Beverages.

Deaths

• T. W. COFFER, 58, for 23 years manager of the Swift & Co. refinery at Harvey, La., recently.

• WILLIAM M. COSBY, 70, founder and chairman of Cosby-Hodges Milling Co., Birmingham, Jan. 6.

• A. MAJOR, 58, president of Major Bros. Packing Co., Mishawaka, Ind., Jan. 9.

• HENRY R. NEWCOMB, 68, vice-president in charge of trade relations for Standard Brands, Inc., New York, Jan. 18.

• EDWARD SMETHURST, 65, operations manager of Borden's Farm Products Co., New York, Dec. 29.

• JOHN STICKEL, 61, owner and co-founder of Stickel-Heppfer Yeast Co., Belleville, N. J., Dec. 26.

• CHARLES H. THOMAS, 87, one of the founders of and former president of National Biscuit Co., New York, Dec. 25.

• PATRICK H. WILSON, 56, vice-president and secretary-treasurer of Seaboard Rice Milling Co., at Galveston, Tex., Dec. 24.

PATENTS

Method for Preparing Maraschino Type Cherries — William K. Tucker, Berkeley, Calif., to California Packing Corp., San Francisco, Calif. No. 2,019,030. Oct. 29, 1935.

Meringue Composed of a Sugar Syrup, an Acid-Reacting Aerating Agent, Egg-Whites Whip and a Boiled Starch Paste—Ernest F. Erickson, Oak Park, Ill., to Standard Brands, Inc., New York, N. Y. No. 2,019,123. Oct. 29 1935.

Seeds of Leguminous Vegetables and Kernels of Cereals or Grains Cooked in Deep Fat Between 212 and 325 Deg. F. Preliminary to Sealing in Cans With Added Moisture and Completing Cook—John T. Knowles to Libby, McNeill & Libby, Chicago, Ill. No. 2,019,141. Oct. 29, 1935.

Caramel Mixture in Dry Powdered Form —Teresa Thompson Speed, New York, N. Y. No. 2,019,365. Oct. 29, 1935.

Sterilizing Milk in Film Form by High Velocity Steam — George Grindrod, Oconomowoc, Wis., to Grindrod Process Corp., Waukesha, Wis. No. 2,019,491. Nov. 5, 1935.

Essential Oil Flavoring Stabilized Against Volatilization During Heating by Addition of Lecithin — Stroud Jordan, Brooklyn, N. Y., to American Lecithin Co., Cleveland, Ohio. No. 2,019,494. Nov. 5, 1935.

Dusting Flour Mechanically Delivered to Bread Dough Molding Unit During Sheeting, Curling and Molding Operations—Bertrand Jassoy, Decatur, Ill., to Purity Bakery Service Corp., Chicago, Ill. No. 2,019,818. Nov. 5 1935.

Means for Making Ice Cream Suckers—William A. Suiter, Rochester, N. Y. One-fourth to James Matheos and one-fourth to Christ Matheos, Spencerport, N. Y. No. 2,019,875. Nov. 5, 1935.

Means for Holding Cone-Shaped Food Containers in Place During Mechanical Filling Operations—Norman M. Thomas to Joe Lowe Corp., Brooklyn, N. Y. No. 2,019,877. Nov. 5, 1935.

Mechanical Means for Grading Nuts—David R. Bailey, Sacramento, Calif., to California Almond Growers Exchange, San Francisco, Calif. No. 2,020,013. Nov. 5, 1935.

Fish Preserved by Sealing in Containers and Subjecting to Temperatures Below 0 Deg. C. Without Freezing—Hugues Marie Jacques, de Meric de Bellefon and Joseph Ernest Alexandre Folliot, to Société René Moubaillarq & Cie, La Rochelle, France. No. 2,020,109. Nov. 5, 1935.

Gelatin Converted to Sintered Granular Amorphous Form by Heating at a Temperature Ranging From 95 to 125 deg. C. With an Increase in Ratio of Its Viscosity to Its Jelly Strength—Jay Bowman, Chicago, Ill., and Vernon Leslie Harnack, Hammond, Ind., to United Chemical & Organic Products Co. No. 2,020,234. Nov. 5, 1935.

Cereal in Shredded or Flaked Form Prepared Under Relatively High Heat and Fruit in Finely Divided State Dried Under Relative Low Heat Combined to Form a Food Product Without Intermingling One With the Other But Held Together by the Cementitious Constituents of the Fruit—Arnold C. Dickinson, Lunenburg, Mass., to Sardik, Inc., Jersey City, N. J. No. 2,020,257. Nov. 5, 1935.

Liquid Foods Sterilized in a Continuous Manner in Two to Three Minutes While Flowing by Injection of High Velocity Steam—George Grindrod to Grindrod Process Corp., Waukesha, Wis. No. 2,020,309. Nov. 12, 1935.

Filled Cans of Foodstuffs Exhausted and Cooked While Passing Through Cooker in Open and Upright Position—Albert R. Thompson to Food Machinery Corp., San Jose, Calif. No. 2,020,342. Nov. 12, 1935.

Eggs Tested and Graded Mechanically — James McHenry to Eastern Market Cold Storage Co., Detroit, Mich. No. 2,020,511. Nov. 12, 1935.

Pectin Extract Adjusted for pH to Facilitate Filtration and Produce Clear Solution —William C. Platt, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,020,572. Nov. 12, 1935.

Natural Color of Greens Retained During Wilting for Canning by Heat Treatment Preventing Formation of Phaeophytin—Benton A. Hook, Oakland, Calif. No. 2,020,645. Nov. 12, 1935.

Oils Emulsified Through Agency of One Part Emulsifier to 50 Parts Oil; 200 Parts of Emulsion as a Whole—Foster Dee Snell and Cyril S. Kimball. No. 2,021,027. Nov. 12, 1935.

Raw Materials

(Continued from page 70)

found flours which are not entirely sound, and flours to which malted preparations have been added. These flours may present individual problems. Chief among those problems is the factor of gluten degradation. Degradation is always a possibility when abnormal quantities of proteolytic enzymes are present; they are almost certain to be present when germinated cereal products are involved. Indeed, some "breaking-down" may even be desirable when, in certain instances, the gluten is unusually tough and resistant. The degree of gluten degradation will, of course, depend upon the amount of protease present, the fermentation temperature, and the duration of the fermentation period.

The presence of protease in excessive or injurious amounts can readily be detected in the baking test. As the fermentation time is prolonged, the dough becomes progressively weaker, slacker, and stickier and the baked loaf in volume, shape, and crumb texture shows unmistakable symptoms of weakness.

In conclusion, the foregoing are the several flour properties most likely to be of fundamental importance in determining bread characteristics. They are the properties which do not lend themselves readily to estimation by chemical analysis, and which must therefore be determined by baking tests. Baking tests made on a strictly scientific basis are quite possible. Apparently the scientific type of baking test is gradually replacing the type in which skill in the art of baking is a predominating and an indispensible feature. The fundamental and critical requirement of the so-called "scientific" baking test is the basic procedure, or fixed, controlled point of reference, from which one may proceed to measure a flour's "response" or "tolerance" toward any treatment or condition to which the flour is likely to be exposed in industrial practice.